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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

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Dealers Determined to Get Bigger Profits Out of Business

Means of making more money considered by N. A. D. A. at annual meeting. Told to get into parts and accessory field. New car sales limited to used car demand.

By James Dalton

MANUFACTURER-DEALER cooperation is likely to be more important than ever before in the coming year. Self-interest, if nothing more, requires that the closest and most helpful relationships possible be established without delay. It is gratifying, therefore, that there is a growing disposition to view sympathetically the individual and common problems of each branch of the industry.

Because of this condition it was unfortunate that many of the factories were not represented by executives at the annual meeting of the National Automobile Dealers Association in Chicago last week. They would have learned much which would have been helpful about the dealer viewpoint.

Five per cent not profit is the goal the members of the dealer organization have set for themselves in 1924. Probably no one will argue that this figure is excessive and a good many persons will be surprised that the average earnings have not been much larger in view of the enormous volume of business in the past two years. Figures show, however, that the rule is proved by the exceptions.

DEALERS generally have no illusions about their own shortcomings and responsibilities. They realize that lack of knowledge of business fundamentals has caused leaks through which profits have trickled away. They have plugged a good many of the holes and they are determined to fill the rest of them. If they can't make a reasonable profit when business is better than it ever was before they are convinced they might better go into some other field.

Leadership in teaching business methods, which was assumed by the N. A. D. A., has borne fruit. It has been directed primarily at mitigating the evils of the used car problem, but has included also the installation of adequate accounting system and a proper comprehension of the real meaning of "overhead."

THIS work will be continued, but greater attention will be paid in the future to promotion of the idea that a substantial revenue can be derived from the sale of automotive equipment. As the number of motor vehicles increases, this branch of the business naturally is growing more rapidly than any other. Even the biggest dealers no longer consider it undignified to enter this field. Factories which want contented dealers with satisfactory profits would do well to foster the movement.

These N. A. D. A. conventions have ceased to be gatherings of automobile order takers, frankly bored at serious efforts to instruct them, and have become meetings of earnest automotive merchants not only willing but eager to learn. They come from all parts of the country to get something to chew on and they get it. The most surprising feature is that they no longer attribute all their troubles to the factories. The past three years have brought an amazing change in the tone and character of the dealer organization.

So far as volume of sales is concerned, these men don't feel the slightest concern. They know 1924 is going to be a big year, but they have no illusions about it. They don't expect it to be any better than it was last year and probably not quite so good. They

know that if factories are unable to adhere to production schedules as large as those which prevailed in 1922 they will have to raise prices.

The productive capacity of the country is substantially larger than it was last year and this should be an important point in factory considerations. Every company expects, or professes to expect, that its sales volume will be so large it will have to operate at capacity. If this is done the total output of automobiles in 1924 will exceed 5,000,000 and dealers know the country can't absorb that many.

There are a good many dealers, and some of the best thinkers in the retail branch of the industry are included in the category, who believe that manufacturers should

John H. Butler,

Dodge distributor in Kansas City, newly elected president of N. A. D. A.

cut their production schedules. They base this contention upon the practical certainty that the turn-over of used cars this year, in point of number, will almost equal sales of new cars. They feel that production should correspond closely to the ability of dealers to absorb the output.

One factor to which maufacturers may not have given enough serious attention is the determination of dealers not to accept more new cars than they can sell. Their more intensive study of business methods has made them better business men. They propose to sell just as many new cars as they can and will cooperate with their factories to that extent, but they don't intend to dissipate their own profits by buying more merchandise than they can market. They have become much more independent than they once were, for they know that if they lose the franchise they now have they would have no difficulty in getting another. The demand for more and better dealers is just as insistent as ever.

While dealers are perfectly willing to admit that their own lack of business knowledge has been responsible for much of the mortality of the last three years, they do not fail to point out that factory failures have driven many of them out of business, willy-nilly. They feel also that when a company fails because there is no particular excuse for its existence it should be allowed to die peacefully and not be resurrected a few months later under another name to meet the same fate again.

This was the sentiment which ran through the N. A. D. A. convention. Their keynote was "5 per cent net profit" and all the speeches were designed to help the dealers make it. One of the most helpful addresses was that of James H. Collins, manager of the Commercial Survey Department of the Chilton Co. He declared that the successful dealer of the future will be the one who is an automotive merchant and not simply a car dealer and he will get a profit out of each division of an increasingly diversified business. Mr. Collins said in part:

There is a question which cries aloud for consideration—are there too many dealers in the business today? The car manufacturer does not think so, because to him the sale of his product is completed when the dealer takes delivery of the car and the greater the number of dealers the greater is the possibility for pushing out a constantly increasing volume of motor vehicles. It is true that increasing dealer mortality lays upon the car maker the necessity for expanding more and more in lining up new dealers, but the detrimental effect of too large an organization, in the final analysis, only indirectly bears on the car maker's business, but bears very directly upon the business of the well-established and reputable dealer.

While you may look with scorn upon the business of the "gyp" dealer and the "alley rat," just remember that whether you will it or not, this fringe of dealers which has attached itself to the national organization is, to a certain extent, forcing you to do business on a basis which all too frequently is neither sound nor profitable. The difference between good business and bad business in many cases may be measured by the comparatively small margin of the total transacted by a large group of irresponsible retail factors. The time is here when it is absolutely necessary for you, as a measure of self-protection, to consider the character of your competition and what effect that competition is having upon business ethics and business profits.

I think that it is now time to turn to the question of the way out for the dealer and particularly to a consideration of where the dealer profits of the future are to come from.

While fundamental changes have been taking place in the national dealer organization, some equally significant changes have been taking place in the character of the market. Five years ago retail sales of all automotive products totaled $4,190,226,000. For the twelve months just passed total retail sales of automotive products were $5,933,400,000. But these figures do not tell the whole history. While the total value of sales has increased so markedly there have been even more marked changes in the character of these sales.

Huge Supplementary Market

In 1919 sales of new motor vehicles made up over 56 per cent of total sales. During the past year sales of new motor vehicles made up only 49 per cent of total sales. Putting the matter more specifically, in a five-year period of time, the sales of motor vehicles in terms of value have increased 26.7 per cent, while sales of parts and accessories have increased 90.7 per cent.

The reason for this is obvious. The vast increase in production schedules during the past few years has brought with it a tremendous increase in what we might term the "supplementary market." Only five years ago the total number of cars on the road approximated seven and one-half millions. Today more than fifteen million cars are traversing America's highways. Every one of these cars must be kept in operation. Every one requires tires; needs its annual quota of replacement parts.

In other words, during the past five years there has been built up a market within a market, which already has grown so in magnitude as to make it constitute approximately half of the total sales outlet. How many of you present today thoroughly understand the fact that during the past year, exclusive of service labor, the American public spent as much for car operation and maintenance as they spent for new cars and trucks? In 1924 the ratio of sales for maintenance and operation will be even greater, and the beauty of this market is that it does not go by fits and starts, but by steady progression, and the volume of sales for maintenance and operation will never be less and must necessarily be more than today.

Car Dealers Losing Profits

How much of this great increase in business is coming to the car dealer? We know ourselves that all too little has gone to swell the profit side of the ledger for the man who has been devoting his efforts primarily to the sale of motor vehicles. If we need direct evidence on this scale, we have it.

Consider first, if you will, the business in automobile supplies. In 1919 there were 43,400 automotive merchants in the United States handling supplies. Of these 23,100 were car dealers and 20,300 were what we might term "independent supply stores" not connected with a car agency. Last year supplies were sold by 68,000 dealers, of whom 27,800 were car dealers and 40,200 were independent supply stores. Please note that in a five-year period of time, during which the business in automotive supplies increased by more than 90 per cent, the number of car dealer supply stores increased only about 10 per cent, while the number of independent supply stores approximately doubled. Does not this look as though the car dealer has been asleep at the switch to permit so great a proportion of this business to drift from his hands?

The same situation exists in the field of service sales. In 1919 there were 43,000 service stations for automobiles in the United States, of which 25,800 were dealer service stations, and 17,200 were independent shops. Today there are 69,000 repair shops in the United States, 31,500 being dealers' shops and 37,500 being independent shops. Here, again, we see an increase of about 20 per cent in the number of dealer shops and of about 110 per cent in the number of independent shops.

Do not misunderstand my purpose in citing these figures. It is perfectly true that many of these independent supply stores and repair shops are small fry; it is true that most of the so-called "cats and dogs" in the industry exist in this group, and yet I say to you that these small dealers have specialized in the sale of supplies, and in the sale of service, and a large proportion of them, at least, must have merchandized supplies and service at a profit, or there would not have been the tremendous increase in the number of these dealers during the past five years.

We know that supplies and service have not been highly important sources of profit to car dealers in the past, and yet we here have a situation in which small dealers have succeeded with nothing to sell but supplies and service. Does not this look as though the car dealer has been blind to his opportunities to permit to drift from his hand a segment of business which now promises to be the biggest thing from the profit viewpoint.

This is particularly true with respect to service. If you will permit me to say so, I feel that dealer service was originally started on the wrong basis. The first service stations were installed by dealers because they felt that "cars cannot be sold without service." Service from the beginning, therefore, for the dealer has been a necessary evil. Until quite recently the dealer who broke even on service was the exception, and from the beginning of time automobile service has been the stepchild of the business.

It may sound far-fetched, but I really believe that the day is not far distant when the new type of dealer will begin to think "you can't sell service unless you keep your car sales up." Just remember, gentlemen, that service is being merchandized today at a profit, and that mighty little of this profit is accruing to the car dealer. In this respect, we could almost consider the independent service man a better merchandizer than the car dealer. Not only does the car dealer lose the profit on the business handled by the independent shop, but the car distributor is losing what should be a legitimate profit on part sales, due to the fact that the independent repair shop is the chief outlet of the "pirate" parts maker.

In the field of car sales we might as well face the facts now as later. The day of big profits on new car sales is gone forever. The production plans and the merchandising plans of the principal car manufacturers are continuing, and will continue, to make it increasingly difficult for the dealer to substantially boost his profits on the sale of new cars. We believe that the way out

C. E. Gambill,
President Gambill Motor Car Co., Chicago, elected first vice-president of N. A. D. A.

for the dealer will be in expanding his business to take on more extensively those lines which are now being handled at a profit by other factors in the industry.

While we are on the subject of new car sales we should consider what has been taking place in the field of manufacture.

Where do we stand today with respect to production? At the beginning of 1923 the factory capacity for car and truck production was sufficient for an output of 4,300,000 motor vehicles. Actual output for last year was slightly over 4,000,0000 motor vehicles. At the factories ambitious programs are now under way. At the beginning of this year car and truck factory production facilities are sufficient for an output of 5,600,000 cars and trucks.

No man can tell at this early date what the actual output will be, but is not the substantial increase in factory capacity at least highly significant? The national dealer organization will be expected to buy and resell whatever cars and trucks are made, whether the total be greater or less than last year. With greater facilities for output it is reasonable to suppose that the car makers will build as many as the dealers can be induced to sell.

It requires no prophet to foreshadow for the present year the keenest era of competitive selling that has ever been recorded, and in this era of competitive selling how many dealers are going to be able to put profit first and volume of sales second, and if new car sales are not to furnish the back bone of dealer profits where can the dealer turn for enough supplementary business to build up his profit ratio?

Dealer Making Own Market

Some months ago a great deal of attention was given to the subject of the forcing of cars on dealers by manufacturers. We have not heard so much about the forcing process during the past year. Of late, paradoxical as it may seem, the dealer has been forcing his own market. He has seen about him a constant increase in the car sales of competitors, and like the car maker, he wants to hold his place in the procession and he does hold his place, but all too often at the expense of profit.

If you doubt this statement, consider what the situation would have been this last year if every factory had turned out only two-thirds of what was actually made, and every dealer with a good line had had a real waiting list of customers. Do you think that you would have made some of the trades that you did make, or putting the matter in another way, would you not have devoted your chief energies to selling new cars instead of buying used cars?

Nobody questions the fact that there has been an active and an insistent public demand for cars during the past year, but the buyer all too often has bought on his own terms instead of on your terms, else you would now be counting your profits instead of, as in many cases, figuring your losses. If the situation has been serious during the past year, just consider for a moment what it promises to be for the next year or two, with factory production facilities greatly in excess of what they have been in the past.

Those practices which have permitted a profit in the past will not be adequate for the future. The automobile business has been highly profitable in the past. Of late the business has failed to show a profit to many. The dealer who survives in the year or two to come will be one who learns:

First, that he is not simply a car dealer, but an automotive merchant, and

Second, that every division of an increasingly diversified business must stand on its own feet and show its own profit.

No successful business is ever maintained for long on a basis of subsidy, and when the dealer fails to get a profit on each item of his business he is either

(1) Inefficient in operation, or

(2) Offering a subsidy to get trade.

More Efficient Business Methods

I venture the prediction here and now that from the profit viewpoint the automobile dealer's business is "coming back"—

Not simply because of greater demand.

Not because of longer discounts.

Not because the "pickings will be easier," but—

Because of efficiency in selling introduced by the better elements of the business and fostered by such splendid organizations as your own National Automobile Dealers Association. Cooperative effort has been the salvation of many an industry, and the sincere character of your own cooperation promises to put back on its feet what should be the highest type of merchandising proposition in America today. The slogan of every man belonging to this organization needs to be "Every sale of every sort, no matter how insignificant, at a profit," and when you can say that truthfully, then the business of the automobile dealer in this country will again be the best business in the world.

What Dodge Bros. have done to increase dealer efficiency and profits was described by Charles F. Jennings, assistant sales manager. He declared his company wanted happy business relations with its retail organization, but that this could not be unless the men in it were prosperous. The factory takes the position that every dealer must make money and every effort is made to cultivate the feeling that the men at the plant are his personal friends. Dealer relationships are based on plain common sense. This applies to sales promotion and all dealer problems. If retailers are to merchandise successfully, they must have an intelligent knowledge of sales in their territories. In order to take full advantage of all these possibilities the company is building various types of cars.

Dodge Bros. established a uniform accounting system for its dealers two or three years ago and when contracts were signed it was agreed that this system must be put into effect. If bankers can be convinced that dealers know their business, there will be little difficulty in getting credit from banks and finance companies. Mr. Jennings warned that it will not always be possible to sell cars as fast as they have been going in the past two years and that it sometimes will be necessary to stock them, for which credit will be essential.

Split Advertising Costs

In respect to advertising, he said that inasmuch as all dealer efforts in this direction help build good-will for Dodge Bros., the company shares dealer advertising expense on a 50-50 basis and matches every dollar a dealer wants to spend.

Mr. Jennings declared that Dodge Bros. attempts to give each dealer an equitable share of the factory output. The factory insists on knowing each dealer's overhead, particularly that part which covers new car sales. Every dealer is expected to take a minimum of cars to cover overhead and a maximum to provide a profit. Dealers naturally want to concentrate on the line most easily moved, but he is required to sell some of every type. If he is unable to dispose of the maximum quota assigned to his territory, an investigation is made to learn why not. Dodge Bros. are thoroughly sold on the principle of exclusive representation, he said, and he believes the great majority of dealers are, also.

Adoption of the flat rate system has enabled dealers to get away from the appellations of "burglars" and "thieves" formerly applied to them by indignant owners, Mr. Jennings asserted. Service has been taken out of the nuisance department and put on a business basis. He believes dealers should organize a service sales force and go out and sell service as a commodity.

Harry M. Fancher, a certified public accountant formerly with Haskins & Sells and now secretary-treasurer of Tom Botterill, Inc., of Denver, urged more general adoption of the simple accounting system devised for dealers by the N. A. D. A. Every automotive merchant

must have a complete accounting system, he said, so he can know exactly what he's doing and be able to check losses. Overhead must not exceed 20 per cent and should be below 15 per cent, while anything less than 5 per cent net profit is inadequate for success.

If dealers would keep their books properly they would raise their standing with bankers and finance companies, Mr. Fancher argued. He appealed for stronger support from distributors in this work. It then would be possible for the N. A. D. A. to obtain accurate records upon which to base its advice and leadership. Because of improper accounting, the average dealer has no charts or barometers with which to sail the business seas.

Used Car Biggest Problem

Because the used car is the most difficult problem confronting the dealers of the country, more attention was devoted to it on the N. A. D. A. program than to any other subject. Two practical methods which can be operated on a national basis have been evolved to reduce or eliminate entirely the losses resulting from the handling of used cars.

One of these systems is the Appleby plan under which Motor Marts have been established already in seventeen cities by the Percy Chamberlain Associates, Inc. of Detroit. Under this plan, whenever a prospect asks a dealer to bid on a used car he is taken to the Motor Mart, where the manager appraises his automobile at its actual value. The owner is then given a warehouse receipt for this amount which he turns over to the dealer and is credited with an equal sum on the purchase price of a new car.

The other plan is the Cleveland "Green Seal" system under which individual dealers agree to recondition all used cars which come into their hands. The cars then are appraised by a representative of the dealer organization and sold at the price fixed by the appraiser. This plan is being fostered officially by the N. A. D. A., although it is in entire sympathy with the Appleby plan wherever it is preferred by dealer organizations.

These two methods of handling used cars were explained as well as the Atlanta Statistical Bureau which is similar in many respects to the so-called Boston plan.

James E. Appleby, in telling of the plan which bears his name, urged dealers to get out of the used car business entirely. He called attention to the tremendous increase in trades in the last three years. It is estimated that in 1920 they numbered 355,000; in 1921, 544,000; in 1922, 1,287,000; in 1923, 3,091,000.

He said the used car is not an individual problem and that the automotive merchant is the only one who is called upon to buy goods on a competitive basis. Competition won't permit him to "buy 'em right."

Public Lacks Confidence

In spite of a dealer mortality of 26 per cent last year, he said, a greater loss is the lack of public confidence in used cars. He described the situation as similar to that which would prevail in the wheat market if standards had not been established by the Government. He didn't think there was anything remarkable about selling 3,625,000 new cars last year but he did think the handling of 3,091,000 used cars was most remarkable.

The value of a used car, Mr. Appleby declared, is the amount of transportation left in it. He can see no chance of success in spite of all educational work if dealers remain in the used car field. Tearing down confidence in used cars cuts the sale of new cars. People can't be stopped from buying used cars. He estimated that there are at least 25,000,000 persons in the United States who want automobiles and with 14,000,000 in use there are left about 11,000,000 prospects.

The volume of new car sales is absolutely dependent upon the ability of dealers to dispose of the used merchandise which comes into their hands. When a dealer is loaded with second hand cars he is necessarily out of the new car business.

Mr. Appleby advocated the establishment of public Motor Marts run on an absolute cost basis. No dealer knows, he said, what a used car is worth. The only standard of value is age, condition, and the law of supply and demand.

Dealer salesmen are unhappy because they could make more laying bricks than selling automobiles. He asserted that they are not more than 35 per cent efficient because they spend 65 per cent of their time in connection with used cars. The dealer doesn't pay sales ability by buying ability as the situation stands now.

Dealers should tell owners they have gone out of the used car business and take them to the Motor Mart. The average owner of a used car is the biggest liar in the world. Motor Mart managers are trained in the psychology of buying. Salesmanship is based on optimism and buying on pessimism. When an owner turns his warehouse receipt over to the dealer, the dealer can take it to his bank and borrow 50 per cent of the face value.

He believes the Appleby plan will increase new car sales. If it won't it's a failure because factories must keep up their volume or raise prices. They can't afford to lose the last 10 per cent. Manufacturers never will get the dealer's viewpoint because they never will have to stand the test. He asserted that if dealers can get rid of the used car evil they can cut their overhead 50 per cent.

How Atlanta Plan Works

The workings of the Atlanta Statistical Bureau were explained by R. H. Martin, president of the Martin-Nash Company of Atlanta. The dealers have been assured by their counsel, he said, that the plan is legal in Georgia. It is based on a realization that dealers must get out of the used car business. Like the Boston plan, it is founded on a gentleman's agreement and under it cars are appraised at their actual value.

R. J. Schmunk, Hudson-Essex distributor in Cleveland, told of the results which followed operation of the "Green Seal" plan in that city. Each dealer agrees to recondition all used cars himself and a Central Bureau inspector looks them over to see that the work is done properly. After the cars have been reconditioned they are sold by the use of display rather than classified advertising. He gave the following figures to show the results attained by the use of this plan in the last three months of 1923 as compared with the same period in 1922, when it was not in use:

	1922	1923
Total number of used cars sold	565	684
Total value of used cars sold	$342,957	$441,867
Amount used car newspaper advertising	$14,350	$12,220
Used car inventory end of year	$226,652	$186,995
New cars sold, number	619	922
New cars sold, value	$1,132,991	$1,342,146

Gain in number of used cars sold	21%
Gain in value of used cars sold	29%
Gain in average used car selling price	6%
Saving in used car advertising	15%
Reduction in used car inventory	17%
Gain in number of new cars sold	48%
Gain in value of new cars sold	18%
Loss in average new car selling price	20%

(*Continued on page* 296)

Chicago Salon Shows Present Trends in Body Design

Pullman exhibits all-steel model built in accordance with railroad practice. The berline type seems likely to replace limousine. Many sales reported.

By J. Edward Schipper

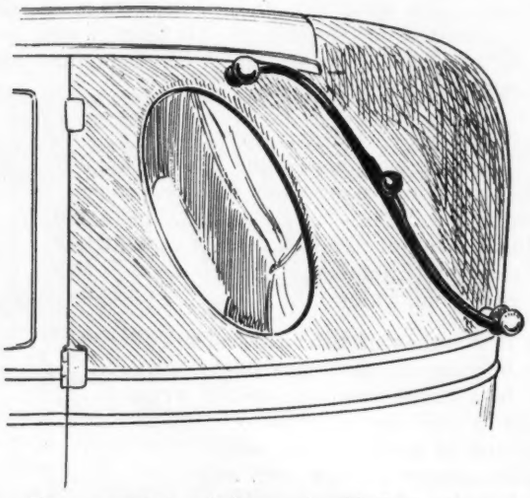
SIXTEEN importers, custom body builders and other producers of de luxe cars, fittings and accessories, exhibited at the annual Automobile Salon which was held simultaneously with the automobile show, at the Drake Hotel. Attendance, according to E. Lascaris of the Automobile Salon, Inc., under whose auspices the exhibition is being held, was very satisfactory and many sales were made.

Four American and five European makes were on exhibition. The foreign chassis were Mercedes, Minerva, Rolls-Royce and Isotta-Fraschini. The American cars were Cunningham, Stevens-Duryea, Lincoln, Packard and Locomobile. Six body builders, Cunningham, Dietrich, Fleetwood, Graff, Merrimac and Pullman showed their products. Driving lights were exhibited by the Lorraine Corp. and balloon tires by the Vogue Rubber Co.

If bodies at the salon suggest probable trends in closed car design, inside-drive jobs seem likely to replace the former type of limousine. Practically all the town car bodies shown were of the Berline type, with dropping glass partition between the driver and the passengers. In many of these bodies efforts have been made to have the glass partition drop entirely out of sight, instead of having part of the glass exposed when the window is down.

The fabric covered body shown at the Commodore Hotel in New York during the New York automobile show was on exhibition again.

Cunningham showed a six-passenger sport car with steps instead of a runningboard. The paint work on this car is unusual. It is gray, with a belt line of cane. The cane, of course, is painted on. The upholstery is in plain, unpleated leather for both the seats and the back. The car sells for $6,700. It is mounted on the Cunningham 142-in. wheelbase chassis and has wire wheels, painted yellow. This same concern is showing an inside drive limousine with a straight glass partition, priced at $8,100, and a cabriolet at $8,100.



Rear quarter windows of elliptical shape are being favored. On this Lincoln they are tilted to accord with the top bow

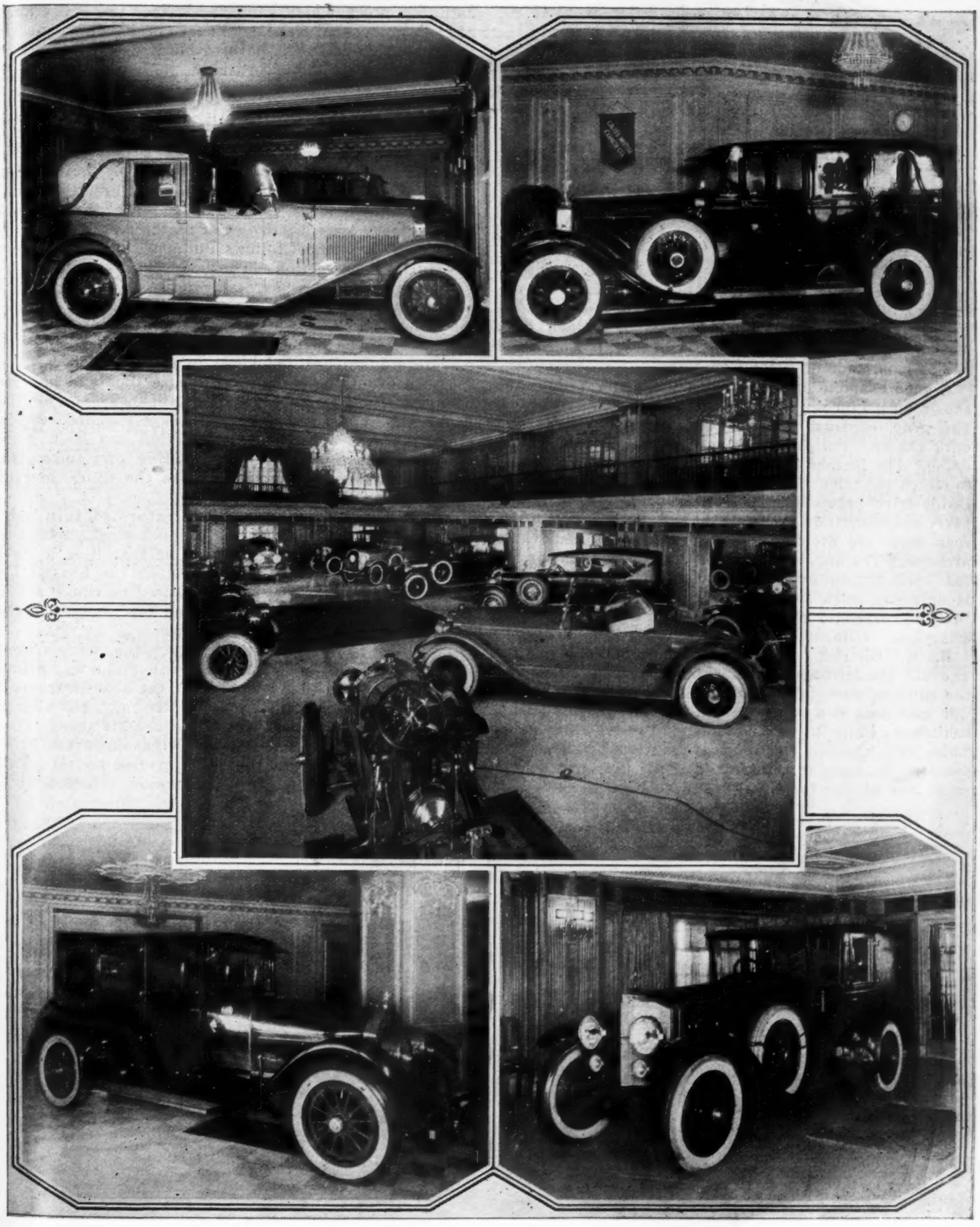
Cunningham exhibited an ingenious four-passenger car, called the Golf Roadster. Entrance to the two rear seats is through a passage between the front seats of the old cloverleaf type. On each side of the two rear seats and contained in the side walls of the car, are compartments for the storage of golf bags. Behind the right rear seat and inside the boat-shaped rear deck is storage space for bags or grips. The side compartments are big enough for four golf bags, so that the entire car is suitable for the transportation of a golfing foursome and its equipment.

Fleetwood Shows Town Brougham

The Fleetwood exhibit includes a town brougham on a Duesenberg straight eight chassis. The car is painted black, with a gold stripe. It is upholstered in Wiese's Windsor weave. There is also an inside drive limousine on a Packard single eight chassis. This is a six-passenger body, painted Fleetwood green, a sort of light olive. The extra seats are concealed and the partition window drops all the way down out of sight, in accordance with the new fashion. This body, as well as the other closed bodies in the Fleetwood exhibit, is equipped with thermostatic ventilators which are concealed in the frame of the dome light. The thermostat is arranged to permit ventilation of the vehicle in accordance with temperature requirements. The entire body weighs 1050 lb. It is constructed of 14-gage sheet aluminum and sells for $6,875. It is painted gray and the leather upholstery in the front compartment is finished in gray to match. The body has flush top and side ventilators.

Fleetwood also showed an Isotta-Fraschini cabriolet with loose pillow-type cushions for upholstery. These are on top of the regular upholstery and give an added touch of comfort. The car is painted in French gray with royal blue trim. One extra seat faces sideways and has a lazyback which folds into the seat. The other extra seat faces backward. The car is a true cabriolet, being absolutely collapsible. The door pillars fold down just above the belt line and the entire top drops back. The top is fully lined, however, and quarter lights are a part of the equipment. These fold down with the top when it is lowered. The car is upholstered in gray broad-

New Body Styles at Chicago Salon



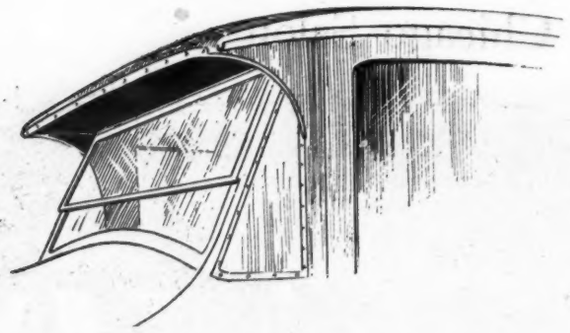
Fleetwood cabriolet body on Isotta-Fraschini chassis

A Rolls-Royce body by Graff

General view of Chicago Salon

Stevens-Duryea

Mercedes



Many of the new visors are formed by extending the roof forward. A good example is shown on the Lincoln

cloth and an artistic touch is added by the fitting of hand-painted toilet cases, done by Ross Proctor, well-known miniature painter. Mounted on the 146-in. wheelbase Isotta chassis and upholstered in French gray leather, this car sells for $13,650. Like all Fleetwood bodies it is made of sheet aluminum.

A good example of inside-drive limousine design was shown on a Lincoln chassis. This car is painted brown and gray, contrast being secured by using light and dark shades. Polished hardware is used with Sheffield finish. The leather in the front compartment is colored to match the trim. The car sells for $6,900. A Lincoln inside-drive cabriolet also was shown. In this, the glass cross partition drops all the way out of sight. The rear seats are divided and separated by a removable arm rest. The upholstery is blue-gray broadcloth for the rear compartment and black leather for the front. There is only one extra seat in this car and it folds out so that the passenger sits sideways. The seat is fitted with a lazyback. The car sells for $7,100.

R. H. Dietrich showed a Locomobile roadster of unusual attractiveness. It is painted satin gray and the runningboard is natural wood with nickeled strips. The rear deck is a boat type with a rumble seat. Graff exhibited a Rolls-Royce landau done in maroon and black. This body has the elliptic rear quarter lights, which seem to be popular, judging by both the cars at the salon and at the show.

In the touring car class one of the most distinctive exhibits was a five-passenger phaeton in dust-proof gray with leather of the same shade with a sort of striped or corduroy effect, which gives the leather the appearance of cloth at a casual glance. Minerva is showing a chassis and an inside-drive car painted black with a red stripe and upholstered in Bedford cord.

Steel Panels and Structural Members in New Pullman Body

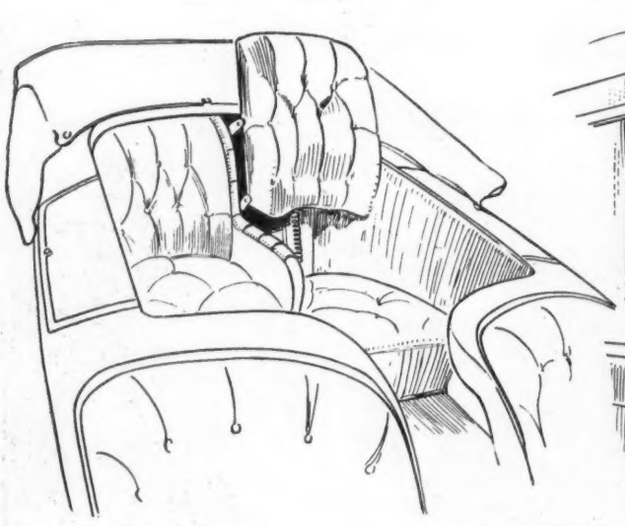
The Pullman all-steel body, which was shown on a Packard Single Six chassis, is painted green and upholstered in Laidlaw cloth fabric. The fenders and running gear are the same color as the rest of the body.

This all-steel model follows Pullman railway car practice in its construction. The body has been under development for over a year and represents an experiment to show what can be done in all-steel construction. Pullman company officials state that they are convinced that the cost can be made equal to wood-framed bodies in moderate quantities and lower in large quantities.

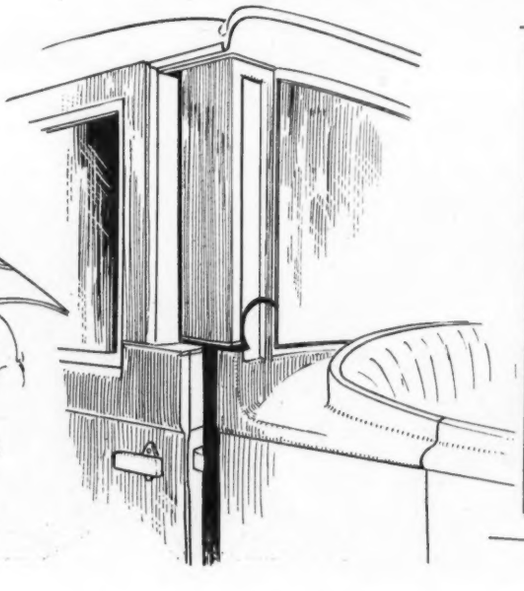
The body at the show is a de luxe type and has not been constructed with a view to maximum economy. The back, window frames, doors, etc., are rounded, and in other features expensive construction has been used. By using square corners, by eliminating lefts and rights, and by standardizing such parts as the doors, marked economies might be effected.

Probably the most interesting feature of this body, which is built up entirely of pressed steel parts over pressed steel structural members, is that it is a rigid unit in itself and does not depend on the chassis for requisite stiffness. Tests at high speed on rough roads, it is claimed, have failed to produce any working of the joints or to cause squeaks or rattles.

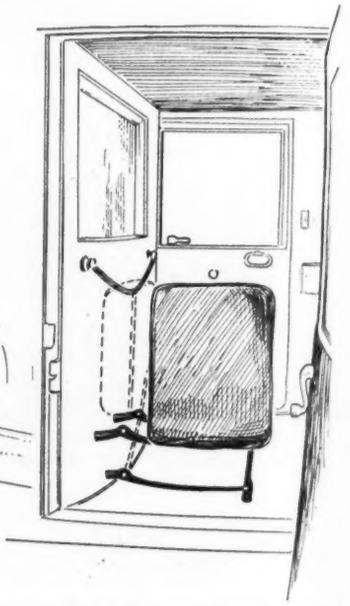
The body is built like a railway coach, with a steel frame bottom unit having integral sills and a web acting as a floor. When this is applied to the chassis frame it acts not only as a foundation for the body, but also as a large plate cross-member in the chassis itself. The front unit comprises a one-piece cowl, dash, part of windshield pillars, and the front quarter side panels. This unit is a spot-welded and bolted assembly. The side units



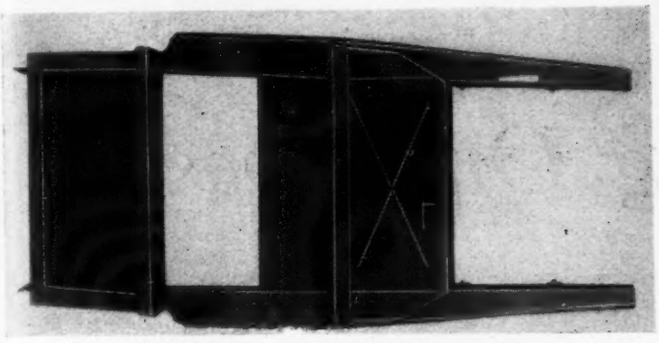
Storage space for golf clubs is provided behind a spring-counterpoised seat back in the Cunningham golf roadster



A fully collapsible body is used on Fleetwood cabriolet. Note break in front pillars



On some of the Fleetwood town cars the one extra seat faces across the car



Frame of Pullman Steel Body

are constructed so that the front pillars telescope, and when drawn together by the fastening bolts combine to form a box section which is narrow, light and strong. The side units comprise part of the front pillars, the door frames and the rear quarters. In the case of the inside-drive car shown on the Packard single six chassis at the show, the rear quarters are steel.

The rear unit includes the back panel and the frame for the rear light. In the car shown at the salon, the steel rear window frame has been arranged to take a rear window which swings out, giving back ventilation. The curve forming the rear part of the roof is also in this rear unit.

The entire structure is tied together by the roof, which acts not only as a cover, but as a structural member. The roof is supported on steel cross-beams and is tied to longitudinal members of combined Z bar and channel section. Anti-squeak material is inserted at the joint. Bolts are used to draw the side structure and the roof structure together in such a way that when the assembly is complete the equivalent of a longitudinal box beam is secured for the length of the car along the sides of the roof. Considering the entire car as a beam supported between the wheels, these members are at the greatest distance from the neutral axis of the car and consequently are a large factor in maintaining the rigidity of the entire structure.

Most of the joints are so arranged that when the assembly is complete a section is formed which will contribute to the rigidity of the unit. The joints are fastened together by bolts with lock washers. Fabric saturated with paint is placed in the joints. The cowl and windshield framings are welded together into one unit which, in assembling, is slid over the front end of the bottom frame and is supported by it. The corner posts receive the front post of the side frame telescopically, the joint being completed by bolting. The box-shaped top plate is provided with a ridge to receive the overlapping roof.

With box-shaped top plate and the "U" shaped sill or horseshoe construction into which posts are fitted and held by "U" brace plates, the sides present a strong and rigid structure thoroughly welded together. The front post is made to fit into the corner post of the front section door openings with hinge lugs jigged for doors. The top plate is provided with a ridge to receive the overlapping roof.

The rear unit connects the two side framing units by means of a special flanged and bolted joint concealed on the outside by a molding which is clamped tightly before the bolts are fitted. At the top is a ridge to receive the overlapping roof, at the bottom, a flange for fastening to the bottom frame.

Side doors have all-steel frame to insure perfect and uniform fit. All parts are assembled and welded together in jigs. Hinges are secured to metal only and will not become loose in service.

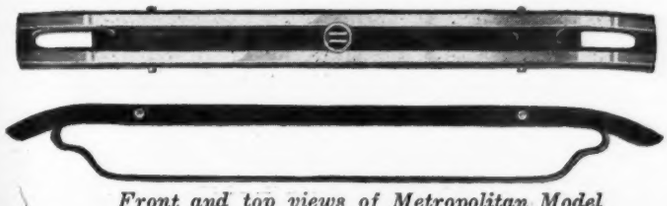
The particular all-steel body exhibited at the Drake Salon on the Packard chassis is claimed to be 50 lb. lighter than the ordinary inclosed body of similar size.

Simplicity of Design is Feature of Federal Bumpers

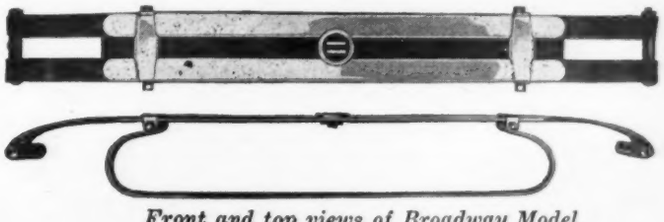
TWO styles of bumper are made by the Federal Pressed Steel Co., known as the Metropolitan and the Broadway, respectively. The distinctive feature of the Metropolitan is its simplicity of design, the number of parts having been reduced to a minimum. The front is made of one plate of cold-drawn open-hearth steel, formed on a large press. There are two embossed or pressed-out parallel ribs running the whole width of the front, which add both to the strength and to the appearance of the model. An oil-tempered spring is fastened to the front by swivel joints.

Broadway models have double spring bar fronts instead of the pressed steel front. Shock-absorbing springs are attached to the front in the same manner as in the Metropolitan model, both ends of the springs being formed into eyes held together by vertical bolts. This non-rigid attachment of the front to the spring permits flexing of the bumper when receiving a side blow, thereby preventing undue stresses on the frame front horns.

A variety of finishes is offered. Some of the Metropolitan model bumpers, for instance, have the ribs on the front nickel-plated by means of a new process claimed to give a coating of great durability, the remaining surfaces being enameled in black. This model is also furnished in an all-black finish. The Broadway model comes either in an all-black finish or with nickel-plated, rust-proof alloy sheaths.



Front and top views of Metropolitan Model Federal bumper



Front and top views of Broadway Model Federal bumper

IN France much attention is being given at the present time to the problem of dehydrating alcohol, for the reason that only alcohol without water content will mix with petroleum fuels in practically any proportion. It is now claimed that by the use of absorbents which act only physically it is possible to produce absolute alcohol at no greater cost than that of 97 per cent alcohol by the present process.

The process is said to be simple and to be carried out in the same apparatus as the present process. Use is made of glycerine and glycerine solutions, and it is claimed that with 12 plates the same results are obtained as in the present apparatus with 50 plates.

Just Among Ourselves

One Kind of Research Which Really Saves Money

BRAKE lining tests carried on by the Bureau of Standards and by manufacturers using apparatus designed by the Bureau are conservatively estimated to have improved the quality of brake lining, as measured by its length of life, by at least 300 per cent in the past three years. Linings which formerly lasted for 5000 miles now stand up for an average of 15,000 miles or more. The cost of relining is roughly estimated at from $10 to $12, but it is necessary to do the work only about one-third as often as in the past. It would seem reasonable to assert, therefore, that the motorists of the country have been saved at least $10,000,000 a year as a direct result of this one phase of the research carried on by the Bureau of Standards. It is such work as this which will have to be abandoned because of the niggardly appropriation of $15,000 for the automotive section of the Bureau for the next fiscal year. Motorists and the automotive industry will be weak-kneed if they don't let Congress know what they think of such parsimony.

Politics Delaying Solution of New York Traffic Problem

ANOTHER proposal has been made for a partial solution of the New York traffic problem, this time by Maj. Gen. John F. O'Ryan, a member of the Transit Commission. He has recommended roofing over the west side tracks of the New York Central Railroad, which extend the length of Manhattan island, and use of the overhead structure as a roadway for north and southbound traffic from the southern to the northern end of the island. This would serve as a solution of the grade crossing problem as well as a means of easing traffic if crosstown streets were sunk under Eleventh or "Death" Avenue and trains were operated by electricity. The idea has merit but there is little likelihood of the city administration agreeing to any proposal originating in the Transit Commission. Better transit for New York has been delayed half a decade by politics and no relief is in sight, notwithstanding the fact that conditions are getting worse day by day. Mayor Hylan has pinned his hopes to buses for a solution of the surface problem but the Republican State Assembly won't let him have them.

Reeves Is Real Diplomat in Dealing with Dealers

"AL" REEVES, the efficient general manager of the National Automobile Chamber of Commerce, is nothing if not a diplomat. Ambassadors and ministers might well go to school to him. Mr. Reeves is in great demand at this season of the year for speeches at dealer meetings and he always accepts if he can. It is his invariable custom to invite questions from his hearers and he has an uncanny ability to answer them. When he is stumped his diplomacy comes to his rescue. A dealer asked him not long ago what the manufacturers would do to solve the used car problem if they had to do it. Reeves pondered just a second and then replied, "It would depend on the ideas of the individual manufacturers, but I'm sure they wouldn't be able to handle it as well as you dealers do."

Motor Car Mergers Aren't Worrying Jordan

EDWARD S. JORDAN, who has met with at least a modicum of success as an independent in the automotive field, is not haunted by the specter of a combination or combinations which will drive the smaller producers out of business. In presiding as toastmaster at the annual S.A.E. dinner in New York he referred somewhat ironically to the subject of consolidations. Prior to that time, in a circular addressed to his dealers in which he discussed the possibility of automotive mergers, he said: "If anyone asked me to pick a day on which I would like to start in the automobile industry, I would say that it would be on the day on which some one corporation or a small group of corporations succeeded in dominating the industry. That would be the day on which I would like to start to build a new car."

"You Can't Corner Style, Brains or Hard Work"

AMPLIFYING his views on this particular subject, Mr. Jordan said, quite truthfully: "While it is comparatively easy to combine oil companies, steel companies and railroad companies to the disadvantage of smaller competitors, it is not so simple in the automobile business, because in the automobile business there is a large element of style. You cannot corner style, brains or hard work." He added that the automotive

More or Less Pertinent Comment on Topics of Current Interest to Men in the Industry

industry will be cornered when: Every American family is satisfied to live in a house which looks like every other house in the same town; the small automobile dealer finds it possible to finance and handle trade-ins on as many cheap automobiles as the factory wants to build; the American people stop graduating from the Ford kindergarten into the grade school and when they stop sending their children to the high school; women are satisfied to wear standardized gowns and everybody eats ham sandwiches in the kitchen instead of keeping a cook.

Newmark Pays Tribute to Durant Imperturbability

"JAKE" NEWMARK, who once wrote books but who now is advertising manager for Durant Motors, is an ardent admirer of W. C. Durant, just as he always has been. He was toastmaster the other night at a dinner of Durant dealers from all parts of Long Island and he took advantage of the opportunity to pay tribute to his chief. He mentioned first the imperturbability with which Mr. Durant took a loss of $90,000,000 when he was compelled to give up his General Motors holdings. He then recalled the day when Mr. Durant was to leave the great company to which he had devoted so many years. Only a handful of big financiers knew what was impending. Mr. Durant strolled in at the usual hour and hung up his hat and coat. Then he turned to W. W. Murphy, his confidential secretary, and remarked, "Well, Murph, we're moving today." That was all. They moved, and Durant Motors was born in a few weeks.

Edsel Ford Hits Keynote of Real Industrial Peace

WHEN Edsel Ford told the employees of the Ford Motor Co. in an optimistic forecast of the year's business that "it is now recognized that an honest day's work must precede an honest day's pay and that the worker who cheats at his end or the employer that cheats at his end are both together doing injury to the general welfare," he struck the keynote of that cooperation upon which amicable industrial relations must be based. While the Fords always have stood for the open shop, they have given labor all the fruits for which organized labor has fought. Their workers are contented and they have no labor difficulties. They give a square deal and they demand one in return. Edsel undoubtedly voiced his father's views, but it has become generally recognized that the younger Ford is not in any sense a nonentity. He's holding down a mighty big job in a pretty efficient way and his father leans on him more and more each year.

Four-Wheel Brakes May Relieve Traffic Congestion

TRAFFIC experts are agreed that traffic congestion decreases as the speed of its movement increases. Foreign cities have recognized this fact and are centering their efforts on making the stream move more swiftly. Dr. Frederick C. Stanley, chairman of the research committee of the Asbestos Brake Lining Association, points out that with four-wheel brakes the minimum stopping distance at 50 m.p.h. has been cut down to 100 ft. and that if a driver is confident he can make a stop within 100 ft. he can drive with comparative safety at 50 m.p.h. provided his road is everywhere clear for 300 ft. ahead. This condition probably never would prevail in such streets as Fifth Avenue and Michigan Boulevard, but there are many others where it would. The men who make traffic regulations might well keep these facts in mind as four-wheel brakes come into more universal use.

"Jay-Walking" Hazard Not Cut by Licensing Motorists

"JAY-WALKING" is the most prolific cause of street accidents. It never can be entirely eradicated but it can be curbed by safety campaigns. That has been demonstrated in New York, although the picture still is sad enough. While 199 children were killed in 1923 in crossing streets not at crossings (jay-walking) the number was actually 30 less than in 1922, although there were 45,669 more motor vehicles in use. In making his report on the subject of accidents, Barron G. Collier, special deputy police commissioner in charge of the Bureau of Safety, points out that: "By patrolling school crossings and doing educational work in the schools the Bureau is cutting down "jay-walking" with children, but the adults are harder to reach. Eliminate "jay-walking" and there will be about half the present number of deaths in New York due to vehicular accidents." Incidentally, it is difficult to see how Governor Smith's plan for a State-wide licensing system for motorists is going to reduce the "jay-walking" hazard. J. D.

What Are the Best Mechanical Tests for Spring Materials?

Difficult to determine quantitative relation between various qualities such as strength, hardness, resistance to shock, etc. Actual value of test results should be considered. British metallurgist says adequate specifications still are lacking.

By Dr. Walter Rosenhain, F.R.S.

THE question of automobile springs is, perhaps, regarded in some quarters as one which has long been settled; that springs made of one or the other of the well-known modern spring steels, such as "silico-manganese," and correctly hardened and tempered under well controlled conditions, leave very little to be desired. It is not, perhaps, for the metallurgist to criticize the productions of the engineer, but it may be suggested, none the less, that satisfaction with automobile springs is by no means universal. Even springs made by the most up-to-date practice and of the most approved steel do not always give the service desired, so that there is still need and room for further work and thought on this subject.

Perhaps the most difficult matter in connection with any effort at improvement in regard to springs is that of testing. It is extremely difficult, if not impossible, to devise a service test that will give truly comparative results. Ultimately, the true test is actual experience in use; this implies keeping careful statistics of the service records of a very large number of springs, and this is a matter of extreme difficulty.

Failures in actual use are generally repaired at the first opportunity, and in many cases no knowledge of the occurrence reaches those desiring to keep a record of the behavior of their product. There is the further difficulty that such service records are, at best, likely to be of use only to an individual manufacturer. Particularly in those cases where things have gone wrong, it is rather too much to expect a full and frank publication of the record.

Progress Depends on Evolution

In view of these difficulties, progress in spring construction must depend either upon a somewhat gradual process of evolution by trial and error or it must be based upon some form of testing which makes it possible to determine in the laboratory which of two springs is likely to give the better service. With this end in view, a number of spring testing machines have been devised and some of these are widely used. The question is whether they give the information which is needed or, rather, whether they give as much information as is really desirable.

Spring testing may be divided into tests which are applied to the material of which the springs are to be or have been made, and those which are applied to the finished springs. The former class are, of course, much more readily applied and are, consequently, much more widely used and more detailed and searching in character. Were it really well known and understood what are the physical properties actually needed in a steel in order to produce the best kind of spring, the whole problem would be immensely simplified. The real difficulty lies in the fact that these things are only known in a very wide and general way. It is not difficult to say that we require strength, hardness, power of resisting repeated flexure without fatigue, and resistance to shock, as well as the power to absorb the greatest possible amount of energy by flexure for a given volume or mass of metal. But in our present state of knowledge is it possible for any engineer to state definitely what are the quantitative relations of these various features required to give the best spring for a given purpose?

Quantitative Data Lacking

A little consideration shows at once that this is not at present possible. It is true that a number of specifications for spring steels are in use, some of them issued, after very careful consideration, by standardizing committees, such as those of the British Engineering Standards Association or the American Society for Testing Materials. But is it not true to say that these are based not so much upon any well understood principles of spring design as upon the requirements which can be reasonably met by certain types of steel when treated in certain well-known ways? If we could be sure that these types of steel, thus treated, really included among them the ideal spring steel for a given purpose, then we might rest content with such specifications as defining the nearest approach to the ideal which is commercially obtainable. This is, however, quite an open question. Wide differences of opinion exist even as to which of the existing steels is really best suited even for laminated springs. When we come to coil springs, such as valve springs, these differences become still greater.

From this point of view it is worth while, perhaps, to discuss the various tests which can be applied to steels with a view to forming some opinion as to their bearing upon the behavior of the steel in springs. Such a discussion will at least serve to clear our ideas as to the properties that really matter in a spring, and to arouse us from complacent acceptance of existing tests and values.

Of the ordinary tensile test very little need be said. The ultimate strength is not only of interest as a guide to the real cohesive strength of the material, but recent research tends to show that it is of fundamental importance as determining the real fatigue range of a steel. There seems to be a closer relationship between fatigue range and ultimate tensile strength than between that range and any of the other physical properties ordinarily measured. The tensile test further gives an indication of the ductility of the steel in terms of elongation and reduction of area at fracture. Here, however, we at once strike one of the fundamental difficulties.

What amount of ductility is required or is desirable in a hardened and tempered spring steel? On the one hand it may be contended that a spring is intended to do its work by means of purely elastic processes and that it never should undergo any permanent set or plastic deformation whatever, so that ductility is an all but useless property, in view of the fact that tensile strength, hardness and high elastic limit must as a rule be sacrificed to an appreciable extent if importance is attached to ductility. On the other hand it is argued that if a steel does not possess a certain minimum degree of ductility it is likely to be dangerous in service, since, if by any mischance it is over-stressed, fracture will occur instead of a mere slight amount of permanent set. This also is true enough, except that if the elastic range of the steel is reduced to secure ductility, the likelihood of over-stressing is correspondingly increased.

This, then, is one of those points upon which some sort of compromise is generally adopted. The point which it is desired to emphasize, however, is that real knowledge upon which such a compromise should be based is not at present available. If we could determine, by experiment or calculation, the best ratio of hardness to ductility for a given type of spring, we should have a true "figure of merit" whereby to assess the value of a given steel for such a purpose or to decide upon the best heat treatment. Fortunately it is often possible to find a combination of some special steel and heat treatment which affords high values for both hardness and ductility, but even in such a case it is unlikely that the best possible has been reached.

Test for Elastic Limit

The tensile test may be arranged to include a determination of the "elastic limit." This term is often vaguely used, but in any case it can only denote a particular value of stress where the departure of the material from truly elastic behavior can be detected. Unfortunately, the value found depends to a very great extent upon the methods used for measuring the extension of the test piece. If rough methods of observation are used, the value may be several tons per square inch higher than where delicate instruments are employed, and the value falls lower and lower as increased refinements of measurement are employed. The question is, what value has an elastic limit determination from the spring point of view?

For some time it has been believed that so long as stresses remained within the elastic limit of a material no harm could be done, even if the stresses were indefinitely repeated. Recent research has, however, entirely discredited this supposed connection between the "static" elastic limit and the fatigue range. Actually, the exact elastic limit of a piece of steel as found in the tensile testing machine may be merely accidental, dependent upon the immediate past history of the piece.

Even where accidental effects are absent, it still remains true, as the result of recent extensive research on fatigue shows, that there is no definite relation between static elastic limit and fatigue range. In a number of materials it is found that the fatigue range considerably exceeds the elastic limit and even the yield stress as determined in a tensile test, while in other cases a very high elastic limit does not appear to be accompanied by a correspondingly high fatigue range. It would seem, therefore, that the real value of a tensile test resides in the determination of ultimate strength and ductility, while from the ultimate strength we can in a general way draw some inference as to the fatigue range.

We turn next to the notched-bar impact test which, in one of its various forms, is often used in steel testing. There can be no doubt that such a test has a very real value, but this lies mainly in detecting unsatisfactory heat treatment in a given type of steel. It is found, very definitely, that the notched-bar test is capable of discriminating between samples of the same steel whose heat treatment has been either intentionally or accidentally varied in a manner which may leave tensile test results almost unchanged. On the other hand, the test is often regarded as furnishing a real measure of brittleness, and the question is whether it can really be accepted in that light.

Evaluating Results

The results of the test are stated in terms of the work absorbed in producing the fracture of a test piece of standard dimensions, and there can be no doubt that a very tough, ductile test piece under this test absorbs much more energy than a very hard and brittle one. On the other hand, however, it may be pointed out that the actual initial strength of the material in resisting the commencement of fracture hardly enters into the result at all. Thus an extremely hard and strong but non-ductile material, like hardened steel, gives an extremely low figure under a notched-bar impact test; but a piece of antimony or bismuth, whose actual power of resisting a blow is enormously lower than that of the hardened steel, gives much the same figure.

The reason lies in this limited degree of similarity between the two materials—that both are non-ductile to such an extent that, once fracture has been initiated, practically no work is absorbed in completing the breaking of the test piece. Could we determine, however, the actual intensity of the blow required to *initiate* fracture, a very great difference between the hard and non-ductile and the truly weak and fragile metal would be registered. It is clear that the notched-bar impact test does *not* measure resistance to the commencement of fracture and may thus not only fail to distinguish between two widely different types of material but may possibly prove misleading in regard to the relatively hard materials used in springs. In these, it makes very little difference how much work is absorbed during fracture; what really matters is the intensity of the blow or shock which the material will resist without damage.

The application of the notched-bar impact test as a means of discriminating between good and bad spring steel therefore must be made with considerable reserve, although it remains of the utmost value as a check on heat treatment in successive batches of similar steels.

Many Difficulties Arise

It is, obviously, no easy matter to devise a satisfactory test for the power of resisting a blow or shock. The only method of approach that suggests itself would be to determine in some way the minimum energy of blow required to initiate fracture. This is not in itself an easy matter, and is complicated by the fact that the extent to which the energy of a blow is really taken up by the test piece in any given form of test must depend upon a considerable number of factors, among which are the speed of the blow and the proportion of the energy of the blow which is transmitted to the supports of the test piece and the machine generally. Even in a simple repeated-blow impact test it is known that the rigidity and mass of the supports upon which the machine is placed materially affect the result.

Consideration of such difficulties clearly shows that a considerable amount of careful research would be needed before such a test could be made applicable for practical purposes. Given such research, however, it seems probable that a fairly satisfactory test of this kind might be evolved. We should then have a means of classifying

spring steels quantitatively in regard to their power of resisting fracture under blows. That would, no doubt, constitute a valuable step forward, but more is required.

For practical purposes it would be essential to arrive at some way of evaluating the relative importance of this shock resistance as compared with high tensile strength and fatigue range, and at the present time at all events, it is very doubtful whether any engineer could arrive at a "figure of merit" in any really sound manner. The relative importance of fatigue range and shock resistance must vary, to begin with, according to the design and conditions of service for which the spring is intended.

Engine valve springs obviously operate under well defined limits of both fatigue and shock, but suspension springs may operate under widely varying conditions. For light, fast moving vehicles running on relatively smooth roads, it would seem that fatigue resistance is of predominant importance, while slow moving heavy vehicles, working on rough tracks, would demand greater regard for resistance to shocks. This is eminently a matter for the engineer rather than the metallurgist by careful study of the behavior of springs both in the laboratory and on the road, it may be possible to arrive at data from which light on these important points could be obtained.

Metallurgist Aids Engineer

To some extent, experience of service performance may enable engineers to form a rough estimate of the true requirements, but the difficulties are great. Some of them have already been mentioned; another is the very real difficulty of deciding, in any given case of fracture, whether the failure is the result of shock or of fatigue or of both. Here, perhaps, the metallurgist could come to the aid of the engineer, since careful study of fractures produced in different ways—i.e., by shock and fatigue respectively—might lead to a means of discriminating by microscopic examination between the two types of fracture. In wrought iron and mild steel this is already possible, with a high degree of certainty. In heat treated steels, however, the microstructure is itself so minute that the difficulty is very much greater; none the less, it may not prove insuperable, and if a satisfactory means of distinguishing between the two types of breakage could be arrived at most valuable data would become available from the systematic examination of service failures.

Two other properties of spring steel, ascertainable by more or less simple means, require consideration. The one which has received the greatest amount of attention is the fatigue range. This is of fundamental importance in regard to the service value of a spring—our only doubt lies in regard to the *relative* values of fatigue range and shock resistance—two properties which, unfortunately, tend to vary in an inverse manner so that one has to be weighed against the other.

Determining Fatigue

Determination of the fatigue range is a matter which has received a very large amount of attention in recent years and we have at our disposal today not only the well-known endurance tests, more or less based upon the original method of Wöhler, but several rapid tests designed to determine the fatigue limit on a single test piece. These are the thermal method mainly developed by Strohmeyer and the "stress-strain" method which has been investigated and developed by Gough. These rapid methods have given excellent results for ductile materials, but are not so readily applicable to hardened and tempered spring steel.

Even if the lengthy endurance tests have to be employed, an exact knowledge of the fatigue properties of a given type of steel is essential from the point of view of spring design. Such lengthy tests, however, need not be applied as a matter of routine testing; if it is found, on extended tests, that fatigue range and tensile strength are definitely connected in a given type of steel, then this relationship can be relied upon at least to the extent of dispensing with an actual determination of the fatigue range for every sample to be tested. All that is needed is to check the correctness of the inferred fatigue range by a single endurance test under a stress which should not bring about failure even after very prolonged application. Such a test would ensure that in the given sample the actual fatigue limit does not fall more than a certain amount below the inferred value.

Tests Linked with Design

At this point reference may perhaps be made to a type of testing sometimes described as "fatigue testing," in which either a single piece of spring steel or an entire assembled spring is subjected to heavy alternating loading which brings about fracture after a few thousand applications. It is sometimes suggested that if one spring withstands a greater number of such repetitions than another, it must therefore be the better spring, at least from the fatigue point of view. To some extent this point is closely linked with the question of design. If the spring, in service, is subjected to loadings causing deflections of a range comparable with that employed in the test, and if it is the repetition of such loadings which is expected to cause failure, then the test and the suggested inference may be justified. As a rule, however, the service deflections are very much less severe than those used in the test—the latter being intensified in order to accelerate it. In these circumstances, the inference is not by any means justified, since under the lighter deflections of service the spring which failed first under the heavy deflections may well prove superior. This is, of course, a defect common to all so-called "accelerated" tests in which service conditions are imitated but exaggerated in order to hasten failure. It is this factor of exaggeration which, in most cases, destroys the real value of the test.

Elasticity of Spring Steel

Finally, a word may perhaps be said about the elasticity of spring steel. In the first place, the value of the elastic modulus is, of course, of fundamental importance, and it is unfortunate, from the viewpoint of the metallurgist, that this can be only very slightly affected by varying the composition and treatment of the steel. It is true that in long series of tests of Young's modulus occasional values as low as 28,000,000 lb. and as high as 34,000,000 lb. have been recorded, but it is difficult to trace any adequate cause for such variations and they must probably be regarded as "freaks" not reproducible in practice.

The suggestion that a steelmaker should produce spring steel to a specification in which narrow limits for Young's modulus were included would hardly be taken seriously at the present time. None the less, a low elastic modulus very materially increases the value of a spring steel from the point of view of shock-absorbing powers, and although large effects on the modulus are not to be anticipated, research in the direction at least of keeping the modulus near its lowest limiting value should be well worth while. There is, of course, the further possibility of replacing steel by a metal having a very much lower elastic modulus —that of the strongest aluminum alloys, for instance, is of the order of 11,000,000 lb. Here, however, the requirement of a high fatigue range sets a limit to possibilities, although even this direction deserves exploration.

The discussion of the spring steel problem might be carried further, but perhaps enough has been said to draw attention to the main factors of the situation.

Material Handling Is Cut to Minimum in Jewett Assembly Plant

Absence of cross flow particularly noticeable. All operations are conducted on one floor, but bays are sufficiently high to enable use of overhead conveyors and hanging ovens with available space beneath. Finished cars are tested on rear wheel drums.

By W. L. Carver

UNUSUAL facilities for straight line material flow and elimination of burdensome handling are incorporated in the new Jewett assembling plant of the Paige-Detroit Motor Car Co. While most of the present-day plants are layed out and organized with a similar ideal in mind, the majority of production engineers and executives have been hampered in their efforts along these lines by the limitations of existing buildings and their arrangement. In this case the buildings are designed and arranged to best accommodate the present and anticipated production facilities and schedules. This feature in conjunction with several unique equipment developments makes the new plant unusually interesting.

With the idea of eliminating the expense and congestion which accompanies complicated trucking routes and transfer from floor to floor by means of elevators, the new plant is single story throughout, although sufficient head room is allowed to permit what amounts to two-floor capacity in several instances. Saw-tooth building construction is employed. Peaks run substantially north and south. The distance from the floor to the cross beams under the gutters of the saw-tooth construction is approximately 14 ft. A striking example of the utilization of this space on two levels is to be found in the arrangement of the chassis drying ovens which are suspended directly under the cross beams, leaving a space of approximately 7 ft. high for storage at the floor level.

Conveyor Equipment Plentiful

As this company has been operating a line conveyor assembly department for an extended period, the entire plant has been developed upon the conception of the ideal characteristics of such a line and the necessary contributing elements. Light, roominess and accessibility have been the primary factors at every point. In addition to the space which is ordinarily allowed for the chassis and the necessary parts storage, adequate provision is made for the assembly hand or operator.

Two parallel chassis assembly lines which are spaced approximately 10 ft. apart and extend lengthwise of the building for 865 ft., form the focus of the entire arrangement. Secondary to these two lines is the frame painting and drying line, 1060 ft. in length, which is located between the two chassis assembly lines and the west wall.

In general, the building may be described as being all fireproof construction. All floors are concrete, the structural work is all steel and the roof is made of interlocking concrete tile panels. All windows are set in steel sash, those located in either the side walls or saw-tooth transoms being provided with bar openers or chain controllers respectively to provide adequate ventilation.

Permanent partitions are constructed of hollow tile and all large bins and racks as well as the office partitions are made of steel. A feature, which is at the same time novel and convenient, is to be found in the location of all piping. Only the sewerage pipes which are tile are located under the floor. All of the remainder, including steam, hot and cold water and air, are carried in the upper structural work with vertical extensions to the desired point.

Separate Color for Each Pipe Line

An apparently small detail, which is of the greatest convenience, is the color standard which has been adopted for each type of pipe line. A basic color, which is easily distinguishable, is painted on each type of line. In a plant of this size a veritable maze of piping is necessary and additions or modifications are to be expected from time to time. Unless some such scheme is adopted there is always more than a bare possibility that the millwright gang will not interpret the blueprint of the plant lay-out correctly.

The new building is 360 ft. wide and faces north on West Warren Avenue. At the west wall this building adjoins the engine plant, which is is 200 ft. wide, making the total frontage 560 ft. The building extends southward for a distance of 988 ft. with an extension at the back which is 138 ft. long and 80 ft. wide for the accommodation of the foot of the frame assembly and enameling line. All bays are 46 ft. long and 40 ft. wide. A concrete unloading dock, 44 ft. in width, is located between the east wall of the building and the railroad switch track and extends southward several hundred feet to form part of the car shipping dock, which comprises an additional four pairs of switches with intermediate covered platforms and a fireproof export building.

As the engine plant extends back 600 ft. from the front of the combined buildings and engines are delivered through the wall near the head of the chassis assembly line, the front part of the new building is devoted to stock room space while the rear end is utilized for the small parts enameling room, the final test and car storage department and the final refinishing room.

Frames Start at Rear

This arrangement coordinates with the arrangement and direction of the conveyor lines. The frame starts on its progress at the rear of the plant and travels forward on the axle and bracket assembly line and thence through the spraying and drying ovens to the head end where the wheels are assembled to the chassis. At this point the frame is picked by an air hoist and transported

by a trolley system to the head of the chassis assembly line. It then travels toward the rear of the plant, where the car is driven under its own power to the final testing department.

Trucks Unload in Receiving Room

Several 16-ft. doors are placed in the east wall to permit trucks to drive directly into the receiving department to unload local shipments. Approximately one-half of the east bay for a length of about 300 ft. is allotted to the receipt and distribution of incoming material. Tires and rims are delivered to storage racks at the extreme front of the shop space and from there are passed across to the tail of the frame line where they are installed. Miscellaneous parts are delivered to the next section and bodies are delivered to the central section, while small valuable parts are delivered to an inclosed stock room, which is well toward the rear of the storage space. Fenders, hoods and other similar steel parts are delivered to the rear of the storage space immediately adjacent to the cleaner conveying line which is located just ahead of the enameling room. This arrangement places all of this material in the logical position for the shortest travel in the finished condition to the correct station in the assembly line.

In following the car through the plant from its inception to the shipping platform several high lights are immediately apparent. These may be covered to the best advantage by starting at the foot of the frame assembly line and following the chassis through to the shipping room. As shown by the plant lay-out, Fig. 1, frames are brought into the factory through the door at the extreme south end of the extension at the back of the plant. At this side they are rough cleaned and placed on the foot of the line with spring horns up.

The conveyor at this point is arranged with the carrying surfaces about 2 ft. above the floor and is just narrow enough to fit between the front and rear springs when the frames are turned over, as shown by Fig. 2. The line up to this point is about 140 ft. long and it is in this length that all small brackets, etc., are riveted on and springs and axles assembled in place. The entire line moves continuously at a velocity of 8 ft. per minute. Frames are placed crosswise on 10-ft. centers.

An air hoist in conjunction with swiveled clamps is used to turn the frames over, the clamp for the front end being shown in Fig. 2. This part of the conveyor is arranged so that the chain returns underneath. Consequently the arrangement amounts to a series of moving tables which permit easy access for the type of work that is performed.

After being turned over the frames continue on the same chain until they pass under the head end of the overhead conveyor, which extends the full length of the enameling and drying line. At the head end the overhead chain is carried downward so that two pairs of de-

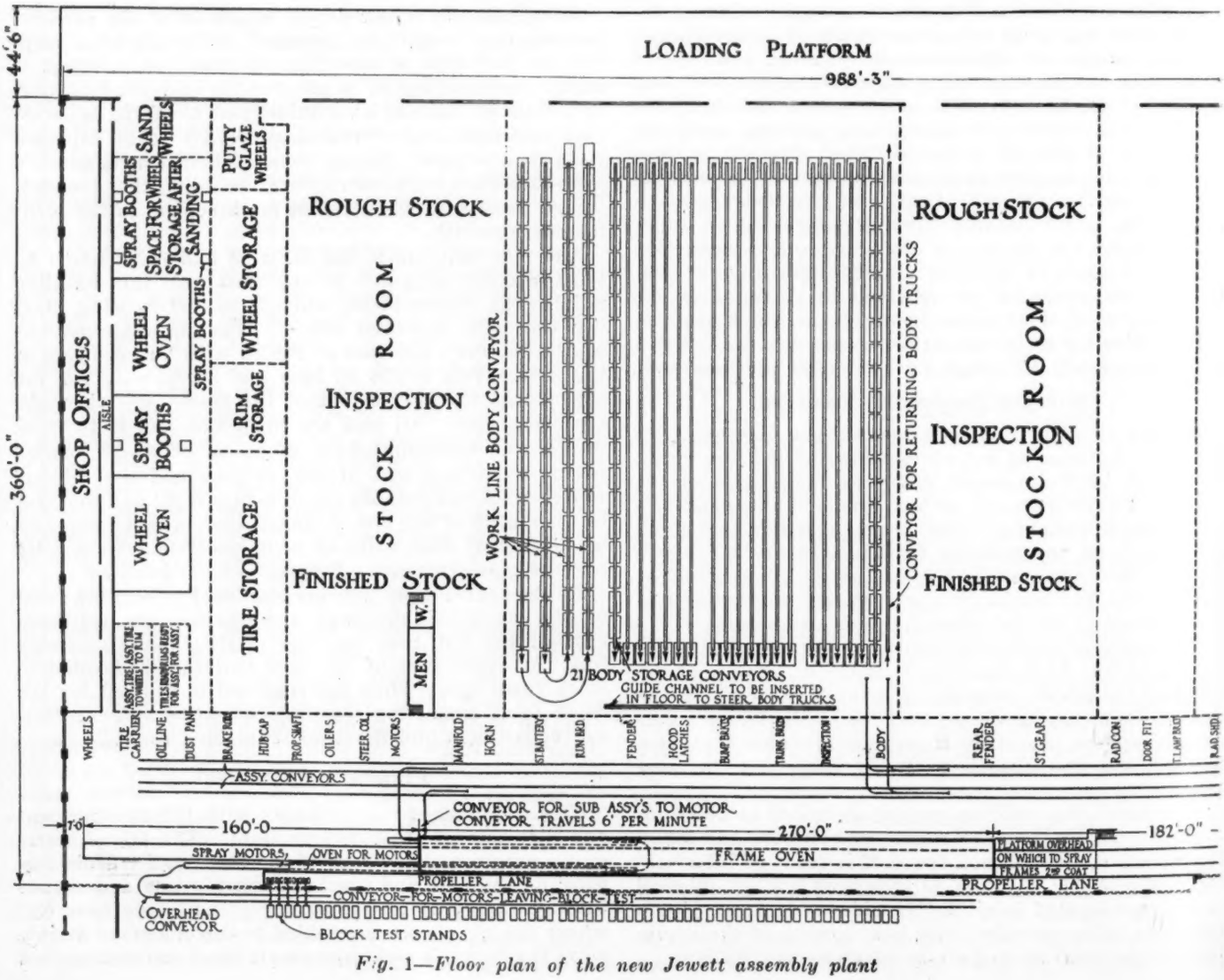


Fig. 1—Floor plan of the new Jewett assembly plant

pendent chains can be hooked into holes in the frame, being arranged so that the frame is hung in a horizontal position. As the frames are carried up the inclined portion of the line to the upper level, as shown by Fig. 3, they are thoroughly cleaned with a commercial cleaning solution and prepared for the enameling process. The floor at this point is protected by large galvanized pans which cover the entire area required for the cleaning operation.

As the frames reach the upper level and arrive at the spraying deck the advantage of the overhead type of conveyor becomes apparent. Since the frames are hung from the conveyor chain, which is overhead and entirely out of the way, the spray-gun operator can pass entirely around the frame and thus insure complete coating with a minimum of effort.

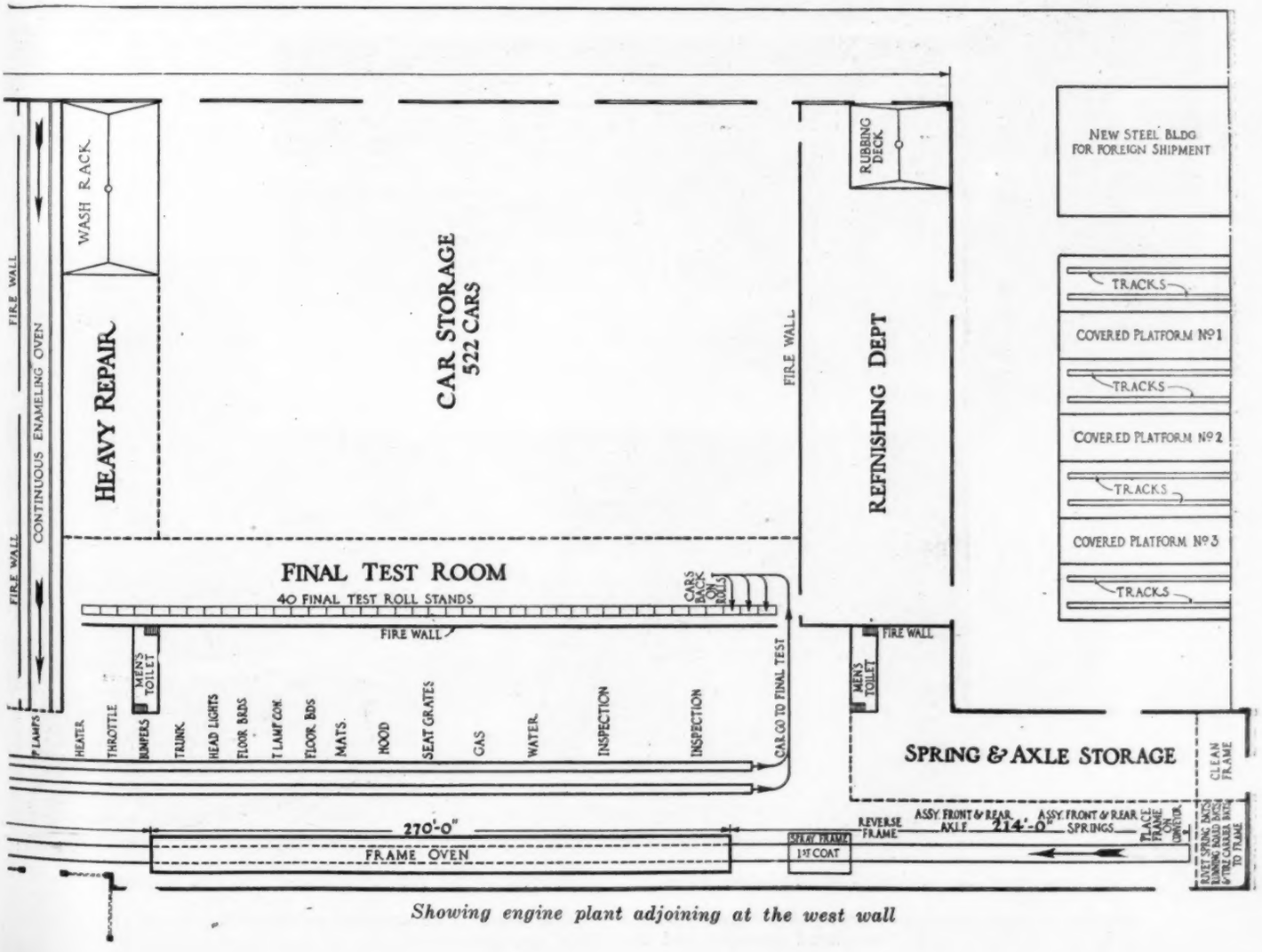
The same arrangement also obviates the possibility of enamel coating and clogging the conveyor chain. Offhand, this seems to be a small detail, but experience has shown that a tremendous amount of trouble is caused by enamel baking on the chain when it is located under the body. In this case the chain is placed at the extreme top of the interior of the oven and returns over the top of the entire structure. This portion of the conveyor is synchronized with the platform conveyor at the head end, advancing at the rate of 8 f.p.m. with the name 10-ft. spacing between chassis centers.

Each of the two oven sections is 270 ft. long. They are constructed with composition board walls and equipped with a steam heating system which maintains a temperature of 150 deg. Fahr. Between the first and second sections a space of 182 ft. is allowed. About 48 ft. of this length is required for the rubbing and spraying deck, which is located at the entrance to the second oven section, and the balance forms a cooling section for bringing the frame down to room temperature before the second coat is applied.

Progressive Enameling

Following the second oven section, another portion of the overhead chain travel is devoted to cooling purposes and finally delivers the frame down an incline to another table conveyor, where the wheels equipped with inflated tires are installed, as shown by Fig. 4. As the frame travels down the incline all of the chassis lubricator connections are installed. The total length of this conveyor line, including the last table portion which carries no individual mounting fixtures, but is equipped with side rails which support the frames at the side channels between the front and rear springs, is 1096 ft. This is said to be the greatest single length of conveyor line in the industry at this time.

An air hoist which runs on an overhead monorail transports the frame from the end of the last table conveyor across to the head of either of the two chassis conveyor lines. As the chassis conveyor travels at 8 f.p.m., which is the speed of the overhead conveyor, and chassis are spaced at 20 ft. centers as compared with the 10-ft. spacing of the former, two lines are required here to handle the output of the overhead line. The head of



Showing engine plant adjoining at the west wall

Careful Layout and Modern Equipment Reduce

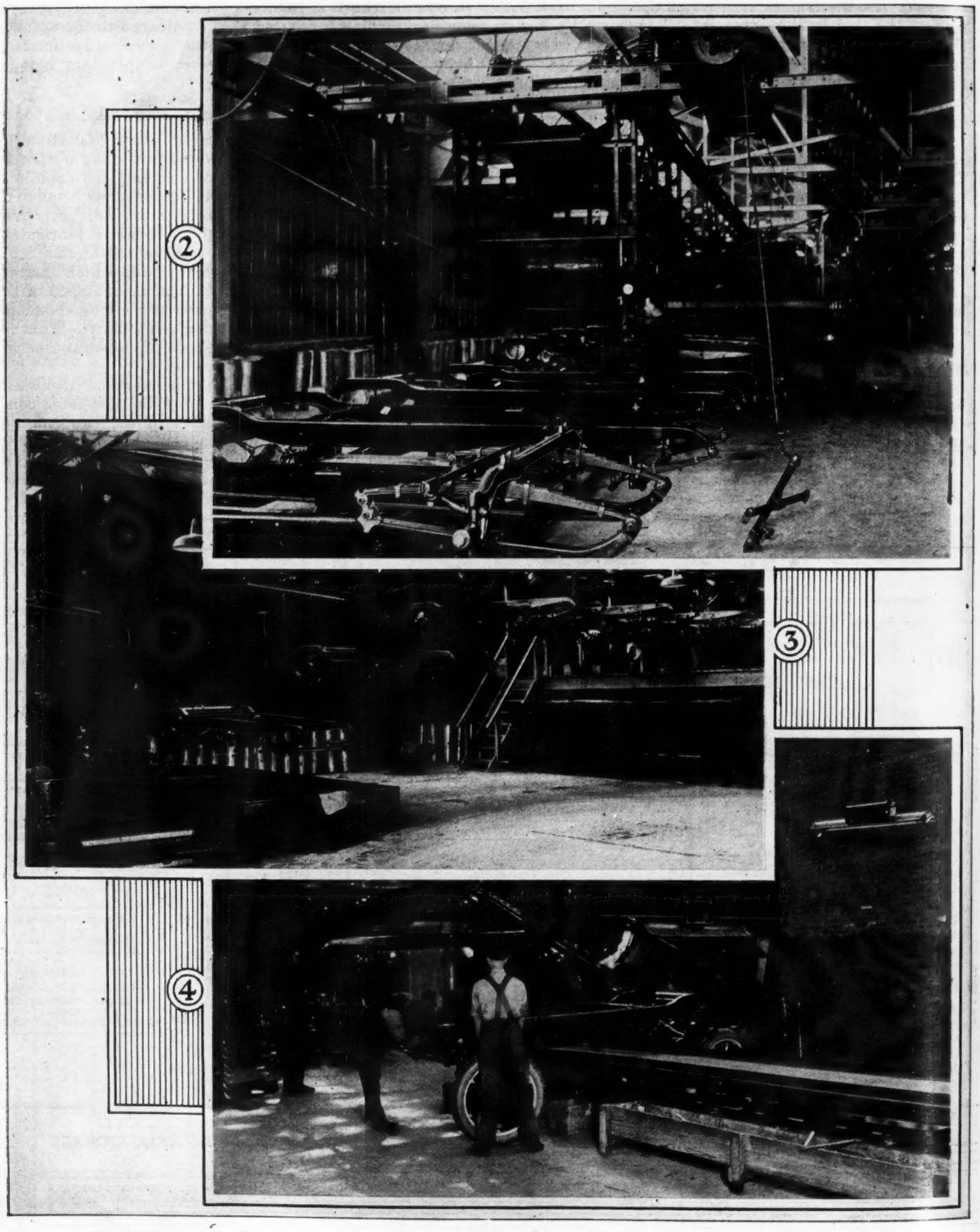


Fig. 2—End of the first part of the frame assembly line showing frame reversing device and foot of paint line.
Fig. 3—Frames passing up inclined portion of paint line with cleaning department at the left.
Fig. 4—Discharge end of overhead conveyor and final table conveyor.

Material Handling to a Minimum in Jewett Plant

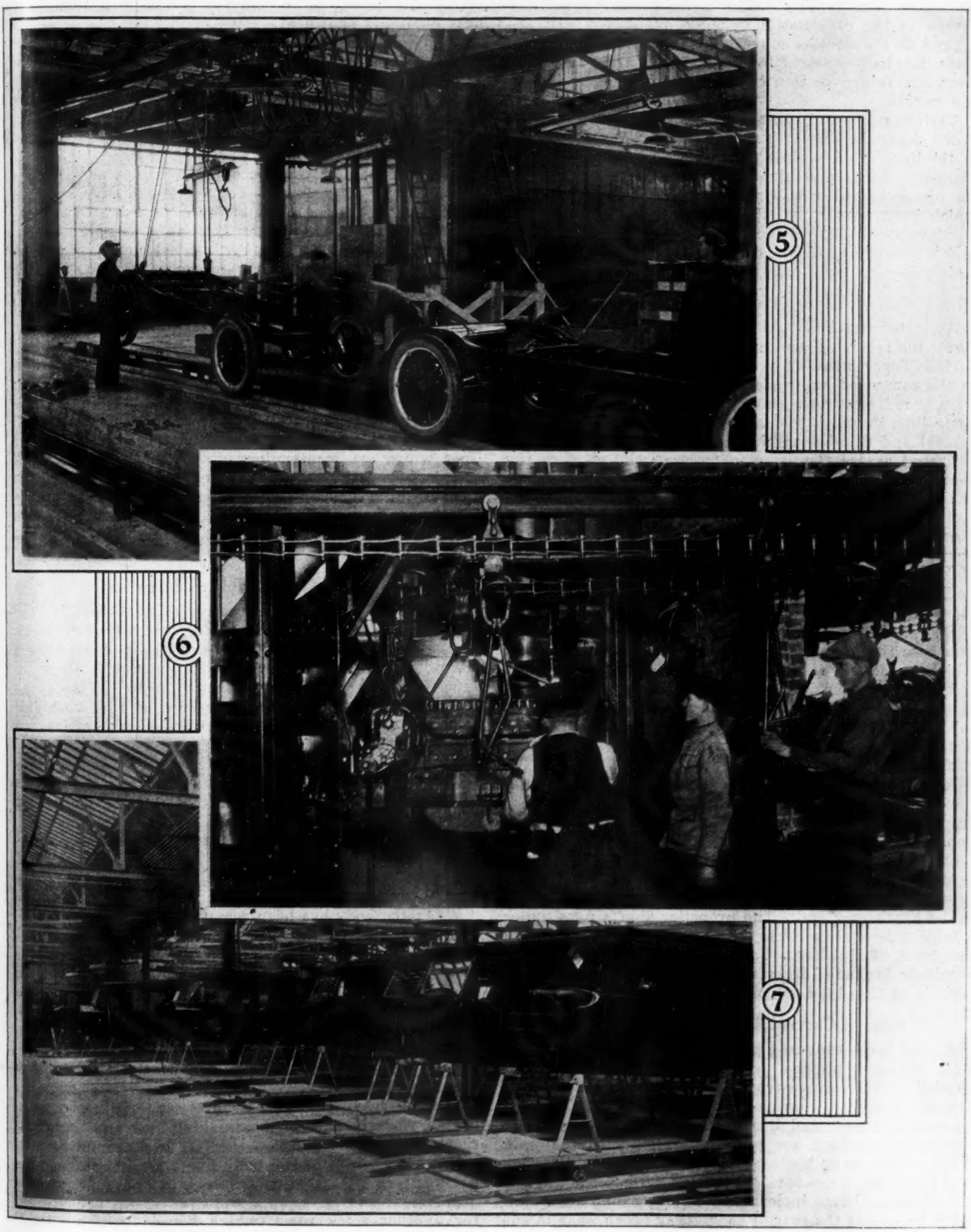


Fig. 5—Chassis being delivered to the head of chassis assembly line by air hoist which has transported it from frame conveyor.
Fig. 6—Engine arriving at first spray booth. Engine plant shows through opening at right.
Fig. 7—Discharge end of body storage system.

the second chassis line is illustrated by Fig. 5, which shows the construction of the chassis lines.

Tires and wheels having been installed, flanged wood rails form the guiding elements while the chassis are driven at the differential housing by dogs which are hinged on the endless conveyor chain. In both of these lines the chain construction is located entirely above the floor, the return section being directly under the driving section.

Various parts and sub-assemblies are installed in the order shown in Fig. 1 as the chassis travels the length of the line. This work is performed in the conventional manner. Racks and bins are placed along the line in the proper locations to supply the gang. The provisions which have been made to supply the line stations and handle the finished product are somewhat more striking and will therefore be discussed in about the order in which they contribute to the line operation.

Lines Are Coordinated

As stated previously, the east section of the building forms the receiving department and feeder for all of the various departments of the shop. Wheels are delivered in the raw wood and metal to the extreme front of the shop space, where they are processed through a transverse line, in which they are sanded, given two coats of enamel and fitted with tires. From this line they are delivered across the extreme front of the shop to the assembly stations. Just to the rear of this department is a section which is equipped with steel racks for the storage of wheels and tires. To the rear of this is another section of 100 ft. width, which is assigned to the storage of various miscellaneous parts which are installed at the adjacent section of the chassis line. Propeller shafts, steering gear parts, etc., are typical of the class of material stored at this point.

Engines are installed in this section of the line, but in this case the supply is derived from a separate system, which is located at the opposite side of the shop. As mentioned previously, the engine plant adjoins the west side of the new building, and engines are delivered through an opening in the common wall very near to the beginning of the incline at the tail end of the overhead conveyor line.

All of the machinery and aisles in the engine plant have been arranged to process the contributing parts from west to east across the shop, assembly and test departments being located along the west wall near the front of the plant. The location of the block test stands is shown at the bottom of Fig. 1. Each of these stands is equipped with a propeller shaft which carries a fan brake at its rear end. The propeller shafts pass under a table type endless chain conveyor which moves toward the front of the line. Fans are inclosed in a well to eliminate danger of accident and the noise that is characteristic of this type of brake.

Engine Carried Through Spray Booth

As the table conveyor approaches the opening in the wall it passes up and over a hump, where the hooks carried by the chain conveyor are attached to the engine. On the overhead conveyor the engine is then carried through the wall and through two spray booths and a drying oven which are placed parallel with the wall. Each of the spray booths faces in an opposite direction and the engines are carried through formed openings in the sheet-steel side inclosures. As the exhaust fan outlet is located at the rear of each spray booth, each of the operators sprays one side of the engine as it passes through his station. In this way the operator remains out of the fumes and spray of the paint and the engines are thoroughly coated with a minimum of manipulation. Fig. 6 shows an engine entering the first booth with the opening into the second booth in the background. The return chain can be seen in the foreground, while the next engine is shown at the extreme right.

After leaving the second spray booth the engines continue on the line through a 150-ft. drying oven which is a smaller replica of the frame oven. The floor of the upper oven forms the roof of the engine oven. As this conveyor line leaves the oven it turns backward and parallels the chassis line back to the point where it turns through the opening in the wall.

The space under the frame oven which adjoins the engine conveyor is utilized for finished engine storage. As the gearboxes are assembled and tested with the engines, this storage represents finished power plants. An overhead trolley system and air hoist again serves to transfer the power plants from the continuous line or storage to the proper points in the chassis assembly lines.

After the mechanical parts of the chassis are installed the body is set on by another overhead trolley and air hoist. This trolley communicates with the end of the body storage system, which comprises 19 storage lines, each 224 ft. long. As bodies come in from the receiving line they are passed through the finishing line, where the wiring and miscellaneous hardware are installed. This work is done on four parallel chain-driven conveyor lines which are located immediately back of the stock room. Two of these lines travel eastward and two in the opposite direction and the bodies are discharged at the east end. From this point the bodies are forwarded on the same caster-mounted trucks to the heads of the storage lines at the east side.

Storage Line Holds 22 Bodies

Each storage line has capacity for 22 bodies, as the trucks are all interchangeable for every type of body. As the trucks are placed on the storage lines the casters are piloted in steel channels and the unit is then advanced as desired by a pneumatic pusher. This is an intermittent form of conveyor which is advanced half of a truck length for each forward stroke of an air cylinder and piston arrangement which is connected to an angle iron extending the full length of the line. Ratchet dogs are spaced along this angle iron, so that for two strokes of the rod all of the trucks are advanced one length and the last body on the line is delivered into the space near the overhead conveyor system. A steel rail is set into the concrete floor to guide the trucks into the correct position under the receiving end of the trolley system.

When the body has been removed, the truck is pushed to a return conveyor at the south end of the body storage department. This continuous chain conveyor returns the trucks to the receiving department at the east side of the plant. It is intended to separate bodies according to type on the different lines. Since the conveyors advance only as the operator turns on the air at the pneumatic cylinders, one or two men at most are able to supply the capacity requirements of the chassis line. The simplicity and convenience of this arrangement are illustrated by Fig. 7, which shows several lines of open bodies, with the ends of the finishing lines and the stock-room partition showing in the left background.

The total width of the body finishing and storage department is 184 ft. Immediately to the rear of this department two bays, or a width of 92 ft., are utilized for another stock room, which houses valuable small parts, such as lamps and other parts of a similar nature. This department is 280 ft. long and extends from the assembly line eastward to the wall. Immediately to the

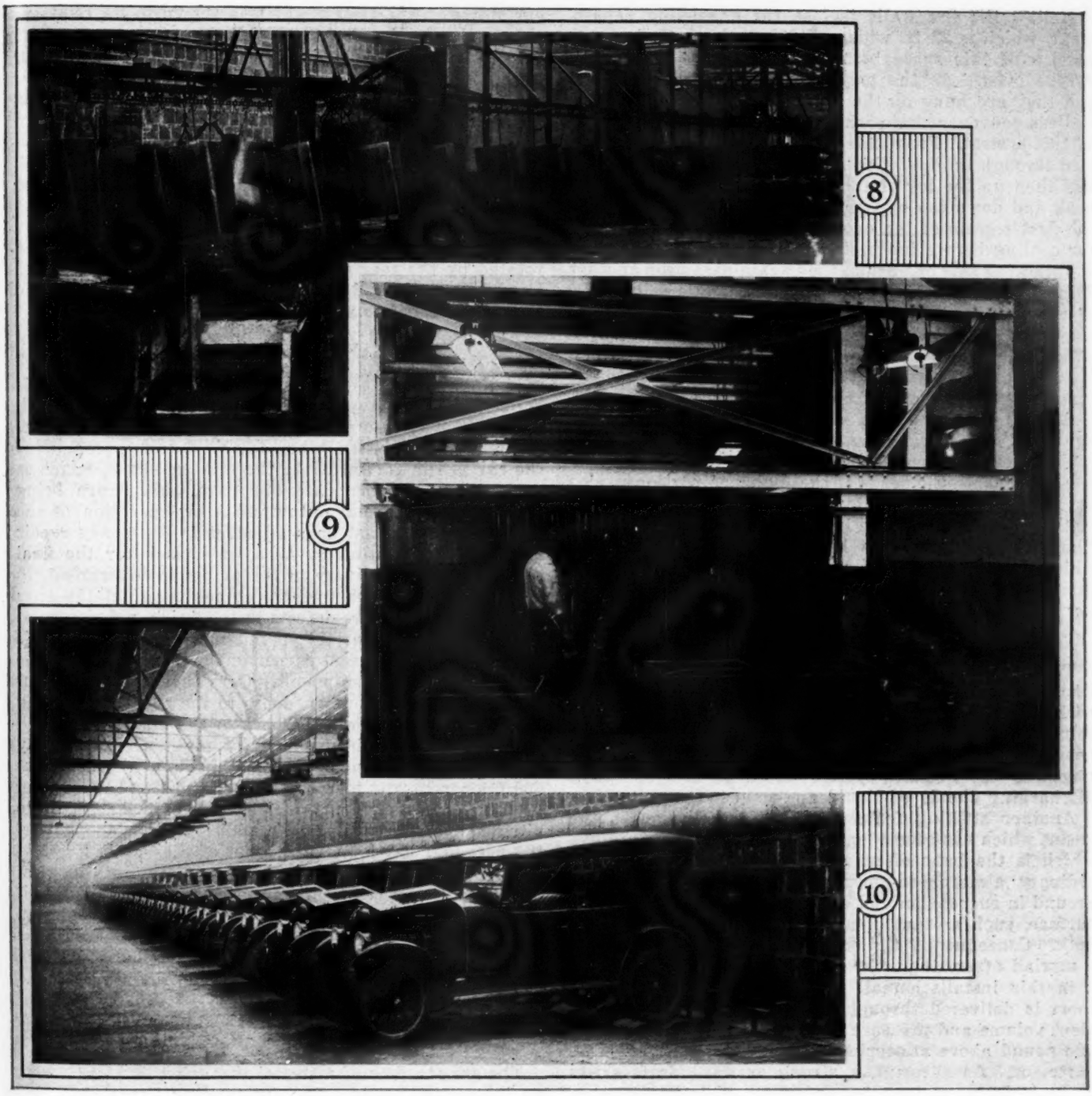


Fig. 8—Feeder line of cleaning system with washer in the middle background
Fig. 9—Discharge end of enameling conveyor showing enclosure of enameling room
Fig. 10—Final test line showing drums and anchorage at first car and manifold of the exhaust fan system

south of this department a space of the same length and a width of 68 ft. is devoted to cleaning and preparing fenders, hoods, etc., for the enameling process which follows in the next department to the south.

The outstanding feature of this department is a gigantic double washing machine, which is correlated with a continuous feed and discharge line. As shown by Fig. 8, which was taken from the east side, two parallel lines of conveyor chain, with return ends forming a continuous loop, are supported at about 7½ ft. above the floor. The line in the foreground travels to the right and parts are hung on by means of hooks. A further elaboration of the conveyor system is planned which will include several north and south lines that will act as feeders for the line shown. Parts on these lines will travel toward the rear of the plant and will be transferred to the present line by hand.

After the receiving line makes the turn at the right end it is elevated to the height shown at the discharge side and enters the washer. Within the washer the suspended parts are first subjected to a chemical cleansing bath, then pass through a boiling water rinse, and exit from the washer as shown. Following this, parts are blown off by high-pressure air and given any required additional attention by a gang working along the line. This line moves at the rate of 18 f.p.m. and discharges to a longitudinal line leading to the enameling oven at the east end. A reclamation department for defective enameled parts is located at the west end of this department and will be described later.

Hollow tile fire walls inclose the enameling department, which is 22 ft. wide and 280 ft. long, the greater portion of this space being taken up by a continuous A-type oven. As the parts are delivered at the east end they are hung on the cross bars of the 12-ft. wide endless conveyor chain which extends the entire length of this system. From this point the parts are first carried through the first dipping tank, then over a drip pan, and then up the leg of the A-shaped oven, through the peak and down the opposite leg. As they emerge from the first section of the oven a short interval is allowed for cooling before immersion in the second tank.

Following this operation, they again pass over another drip pan and through a second oven, which is a duplicate of the first, and then out at the unloading station, as shown by Fig. 9. As the gage of the chain is 12 ft., the effective loading space is regarded as 11 ft. length, which is stated to be the greatest of any oven now in use in the industry. The velocity of this conveyor is 11 in. per min. and the parts remain in each oven for approximately one hour.

The ovens are heated by oil-fired furnaces which are located beneath the peaks of the A-shaped portions. The burners are controlled by electric pyrometers, which maintain the temperature in the peaks at 450 deg. Fahr. These furnaces serve as heating elements for the air which is circulated through the ovens after passing through a washer before its passage through the heating chamber.

Fire Risk Minimized

To minimize fire risk, the enamel tanks are equipped with automatic drain valves, which are interconnected with a Foamite system. In case of fire all of the enamel solution would be drained into closed tanks located beneath the iron plate floor within four minutes. Simultaneously the Foamite system would go into operation discharging clouds of liquid and flame-smothering gas.

Another striking feature of the installation is the means which has been adopted for the prevention of dust, which is the bane of many enameling plants. In any ordinary atmosphere, myriads of dust particles float around in suspension and deposit on any tacky or sticky surface, such as that of a part just out of the enamel bath. Consequently the enameled surface is marred by a myriad of small particles.

In this installation all of the air in the enameling room is delivered through a large air washer in sufficient volume and pressure to set up a pressure of about one pound above atmospheric throughout the entire department. As a result, a strong outward draft exists at both doors, and no necessity for airlocks or other preventive means exists. This feature is not only valuable as a dust preventative, but also serves to supply the workmen with a clean, cool atmosphere.

Finished enameled parts are delivered at the west door and are inspected at this point. If any defect is shown in the finish, the parts are immediately passed back to the salvage department, which is included in the cleaning department. Here the parts are first hung on an overhead trolley system, which carries them into a large tank containing a lye or similar boiling solution. After passing through this they are again inspected and given any further required cleaning and are again attached to the feeder side of the cleaning line for a repetition of the entire process.

As the cars approach the end of the chassis assembly lines, which are 965 ft. long, two bays, or approximately 92 ft., is devoted to inspection work. At the end of the line the engine is started and the car is driven off the line under its own power and enters the final test and car storage department, which is shown in its relationship to the line by Fig. 1. In this department, a bank of 40 test stands is located along the west wall, as shown by Fig. 10.

The car is backed into the stand so that the rear wheels are cradled in two pairs of drums, which are carried in three plain bearings for each of the shafts, front and rear. The car then is anchored in place by chains which attach at the rear end, and the end of the muffler tail pipe is connected to an exhaust fan system, the manifold of which is shown running along the tops of the cars at the rear. The gears are then engaged and the drums are rotated by the rear wheels. Each drum weighs several hundred pounds and therefore applies considerable load to the entire power plant.

Final Inspection

If any major corrections are necessary the car is shifted to the "heavy" repair bay located along the north wall, which is also the rear wall of the enameling department. Otherwise, when the final test is concluded the car is run forward into the storage space, which is designed to accommodate 522 cars, this figure being just over the normal output of 8 hr. operation of the plant. The two east bays adjacent to the heavy repair department are fitted up as a wash rack for the final cleaning before delivery to the shipping department.

A refinishing department occupies the final 1½ bays of the building. Any defects in the finish, upholstery or tops are corrected at this point, and a rubbing deck is located in the southeast corner of the department for the final polish before shipment. Cars then are driven out of any of the three 16-ft. doors to the covered shipping platforms which adjoin the back of the plant.

Provisions have been made for night as well as day operation. The plant is equipped throughout with about 600 Cooper-Hewitt mercury vapor lamps and more than 1200 incandescent lamps, which are provided with white vitrified enamel reflectors. In addition to the shop space, the first half bay across the front of the building is laid out for the shop offices and a complete metallurgical department. Thus a complete manufacturing unit in all of its aspects is housed under one roof. The tool design and the plant control departments occupy similar space in the engine plant, and the tool room is located in the northwest corner of the same building, rounding out the entire scheme.

Absence of Cross Lanes Noticeable

The smooth flow of material through this plant forms an interesting study. The outstanding impressions are the absence of cross lanes or interfering lines of material flow, the minimum of handling involved for the amount of material that is moved, and the liberal space allowances, although no extravagance is shown along this line.

As the engine plant receives its material from the west side and the assembly plant is fed from the east side, as described, all parts move toward the center of the plant as embodied by the chassis assembly lines. These lines deliver their output to the rear and out to the shipping platforms. Although the plant gives the impression of roominess, no item of space is wasted. On the other hand, the plant as laid out is amenable to further expansion of manufacturing effort as desired. The land back of the engine plant is clear and it is not difficult to visualize further manufacturing departments which would tie into the present scheme without producing any further confusion or material handling difficulties.

New Type Differential Prevents Traction Loss on Slippery Ground

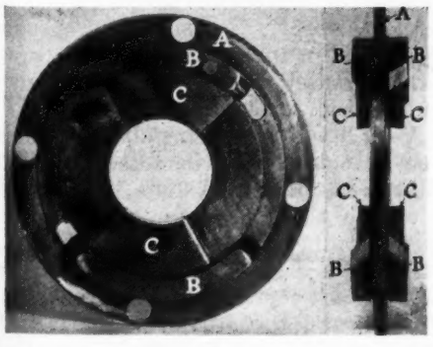
Permits driving wheels to rotate at unequal speeds whenever required. Used on tractor before adaptation for automobile. Without gears, pawls or ratchets. All parts of forged steel.

A DIFFERENTIAL of the type which does not cause a car to lose traction when one of its wheels gets onto slippery ground, yet allows the two driving wheels to rotate at unequal speeds whenever this is required, has been developed by the Winnebago Tractor Co. and is to be marketed for automobile purposes under the name of the Bement Drive. Previous to its adaptation to automobile work it had been used successfully for four years on the Winnebago Chief tractor, and the manufacturers feel that this has demonstrated its efficiency and durability.

There are no gears, pawls and ratchets in the device, and all parts are made of drop-forged steel. The illustrations show a model developed for the Ford, but designs for other cars are quite similar.

Reference to the illustrations shows a spider plate *A*, on which are mounted the two cam pieces *B*. The ends of these cams are cut to a 45-deg. angle and slightly rounded. It will be noted that there are two cams on each side of the spider. Each pair of cams is held together by rivets, and the cams can slide in circular openings cut in the spider. There are four driving lugs or dogs on the spider, indicated by *C*, which are slightly below the surfaces of the cams *B*.

The clutch pieces *D*, although shown in the illustration with two keyways, *F*, in production are made with four



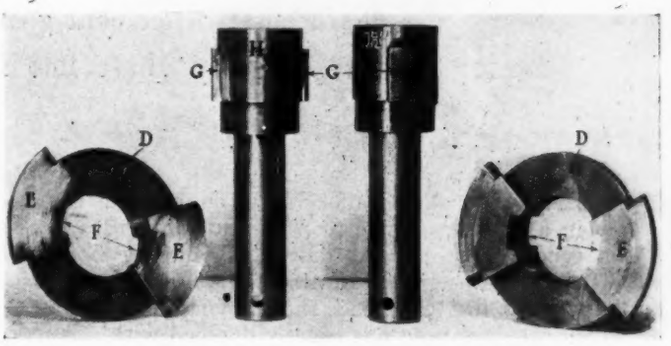
Left—Bement drive assembled

Right—Spider plate with cam pieces and driving dogs

broached openings to take a four-spline slide, *H*, fastened to the ends of the axle shafts. The clutch pieces also are provided with two lugs each, *E*, and as will be seen from the illustration, are beveled at an angle of 45 deg. over a certain portion of their surface to correspond with the bevel on the cams.

In assembling the drive, the pieces *H* are keyed to the ends of the axle shafts, clutches *D* slipped over the slides *H* and the spider inserted between them so that the lugs *C* come between lugs *E*. Before the housing is slipped into place a coil spring of large diameter and exerting a pressure of 16 lb., in the case of the differential for Fords, is placed against the pieces *D* and sides of the housing. This keeps the lugs in the position mentioned above.

It will be seen that when the load is applied on the spider, such as driving the vehicle forward, the lugs *C* will drive the lugs *E* and, therefore, the axle shafts. Now, should one wheel overrun the driving member, as in turning a corner, the lugs *E* on the clutch pieces will slip out



Axle shaft hubs and clutches of Bement drive

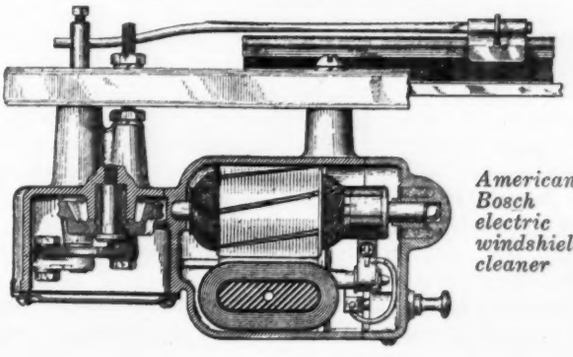
of engagement with the lugs *C* because of the cams. Lugs *E* will then ride the tops of the cams and not the surfaces of lugs *C*, because, as mentioned before, the cam pieces are slightly higher than the lugs *C*. The springs serve to force the clutches in place again.

In going down a hill, should there be a tendency for the wheels to turn faster than the spider driving them the lugs *E* on the clutches work together and in their travel forward push the cams ahead instead of riding them, thus bringing the driving surfaces of the lugs into contact alternately. This action takes place until the spider again acts as the driving member.

Bosch Electric Windshield Wiper

A WINDSHIELD wiper driven by a small electric motor has been announced by the American Bosch Magneto Corp. It is finished in black and aluminum and secured to the windshield in such a manner as not to obstruct the driver's view.

The motor is of the series wound type, which develops the maximum starting and stalling torque for a given current consumption, and the normal current flow is only 1¼ amperes, it is stated. To eliminate the possibility of magnetic hum at high speed, the slots in the armature core are inclined relative to the shaft axis. From the armature shaft the motion is transmitted through a worm and worm wheel and through a crank and connecting rod mechanism. The gear compartment is separated from the armature compartment by a cast wall.



American Bosch electric windshield cleaner

1924 Models Show Changing Trends in Front End Drives

Attention has been concentrated on problem of silence and balance. Of manufacturers building own engines, 47 per cent use chain and 53 per cent gear type. Arrangement of camshaft and of accessory shaft has been altered in many instances.

By J. Edward Schipper

DEMAND for better silencing of engines has resulted in a further change in representations of different types of front end drive. Chain drives, which were found on 19 per cent of all models in 1921, are fitted on 38 per cent in 1924, hence the proportion of all models on which they are used has exactly doubled within a space of three years. Of the car manufacturers using their own engines, 47 per cent now use chains and 53 per cent gears, 44 per cent of the gear front end drives comprising non-metallic gears. Alterations have been made in many of the chain drive installations, and the same can be said of those employing gears.

Concentration of the attention of automobile engineers on the problems of silence and balance has led to the discovery of some important facts, which in turn resulted in an increase in the percentage of chain drive and in modifications in the gear drives, particularly the increased use of non-metallic gears. The arrangements of the camshaft and accessory shaft for both chain and gear drive also have been altered on several installations.

New Chain Applications

Two car manufacturers, McFarlan and Lexington are using the chain drive for the first time this year, and sixteen entirely new engines were brought out during the year 1923, which employ chain front end drive. One manufacturer of passenger car stock engines, the Wisconsin Motor Mfg. Co., brought out an engine with chain front end drive in the course of the year, while Continental and other engine makers continue chain drive on certain six-cylinder models which employed this type of drive for the first time during 1923.

The Packard eight-in-line, the Stutz Speedway, the Essex, Chrysler and McFarlan smaller six, seen for the first time during the latter part of 1923, all have chain front end drive. The new Buick, announced Aug. 1, 1923, has a G. E. Textolite camshaft gear, this same material being used also on the Marmon, Kissel and Herschell-Spillman engines.

There are other reasons for the increase in chain driven camshafts and for the adoption of non-resonant, non-metallic gear materials besides a desire to silence the front end. When silent chains are adopted, the choice is often made because it permits greater tolerances and consequently cuts the costs. It is this latter factor which has been largely responsible for the adoption of silent chain front end drive for cars in the lower price ranges, even though the initial cost of the chain front end drive is higher than that of the gear drive.

Crankcase castings often change in shape either because bolts or cap screws are tightened, or because warping occurs, particularly after the engine reaches running temperature. Engineers point out that with the chain drive this makes very little, if any, difference, because of the elasticity and adjustability of the chain and its ability to accommodate itself to variations in center distance. This results in a reduction in the number of rejections and consequently reduces the number of engine tear-downs necessitated by faults in the front ends. The cost of tear-downs is such that where continual trouble of this kind is being experienced the chains are said to be easily worth their extra cost, quite aside from considerations of silence.

Triangular Type Popular

Practically all of the new chain front end drives adopted this year are of the triangular type, the crankshaft gear, camshaft gear and accessory shaft gear being driven by a single chain passing around all three sprockets. Some of the Link-Belt installations use a fourth sprocket which contains a spring tension device acting as an automatic adjustment. As a rule this spring tension device bears against the back of the chain, thus increasing the wrap of the chain about the sprocket, as well as acting as an automatic take-up and anti-vibration feature.

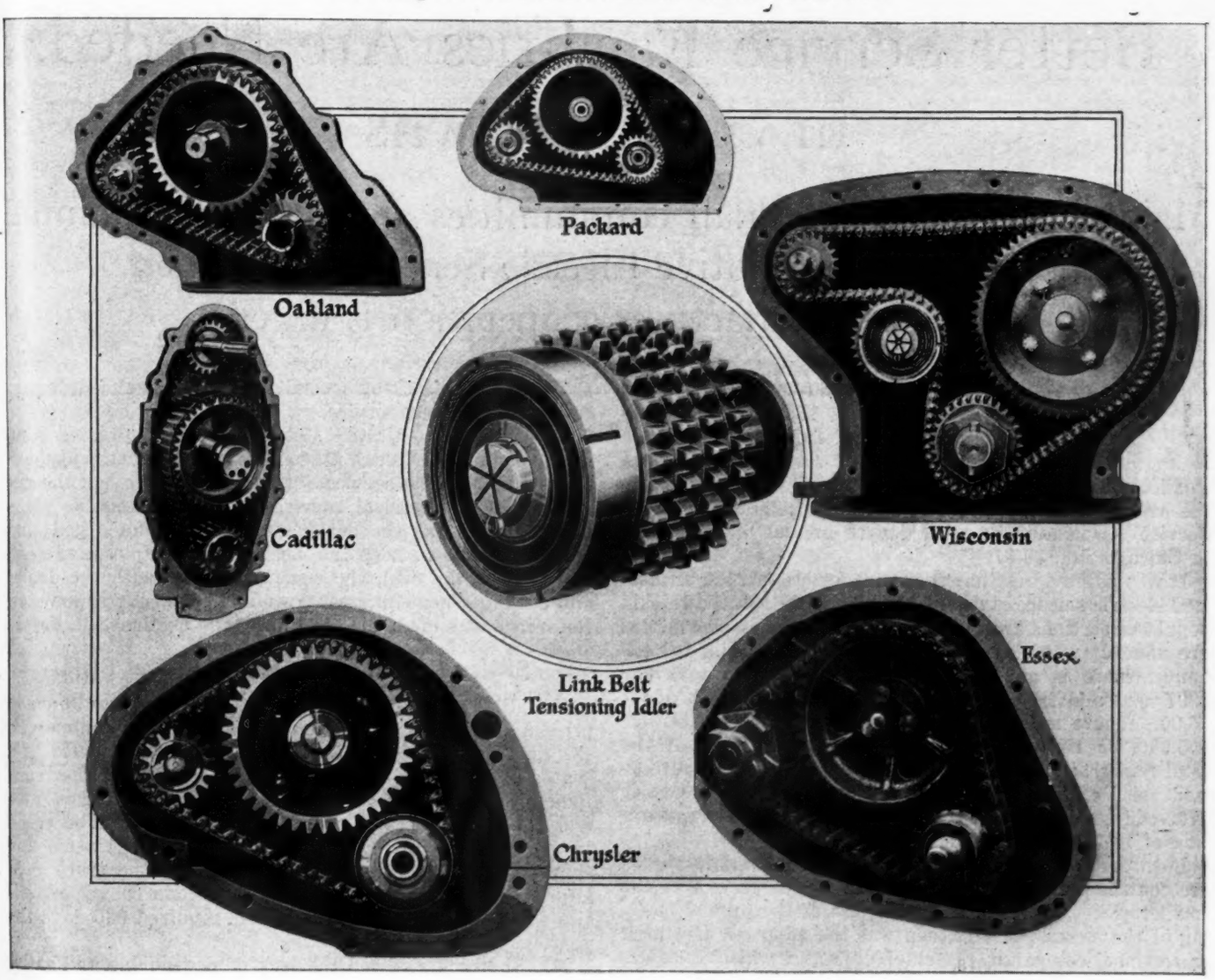
The new Cadillac V-63 has a Morse installation which differs materially from that on the previous Cadillac. This adjustment feature has been abandoned and a wider chain employed. In this engine there are two chains. The camshaft is directly above the crankshaft, and the fan, generator and distributor are mounted coaxially above the camshaft. The crankshaft carries a 21 tooth sprocket, the camshaft a 42 tooth, and the accessory shaft a 21 tooth. A chain of 1¾ in. width and 56 links is used between the crank and camshaft sprockets, and one of 1½ in. width and 57 links is used for the drive from the camshaft to the accessory shaft. The fan drive is taken through a friction clutch in the fan shaft, with the clutch spring so adjusted that the fan is relieved of sudden shocks.

Automatic Chain Adjustment

The new Wisconsin engine for passenger cars has a four sprocket, Link-Belt back type silent chain drive. This is virtually a triangular drive with the automatic adjustment sprocket inserted between the accessory shaft and the crankshaft. The automatic take-up, which has been described previously in AUTOMOTIVE INDUSTRIES, contains a clock spring which exerts a pre-determined pull on the chain, thus automatically maintaining the desired tension.

One of the features claimed for the automatic adjustment is that, since the tension in the spring varies with torque impulses on the crankshaft, the period of the au-

Examples of Front End Chain Drives



tomatic adjustment spring continually changes and this prevents the chain and camshaft becoming tuned to the crankshaft vibrations.

Compactness of Design Sought

In the light six-cylinder class it is desirable to have a short engine and therefore to compress the front end drive into as small a space as possible. A good example of this type of car is the new Oakland Six. In the Oakland front end layout 20, 40 and 15 teeth are used in the sprockets, with a chain of 59 links, 1¼ in. wide. The small sprocket drives the generator only, the fan and water pump being driven by a belt, the drive pulley for which is mounted on the camshaft.

The Link-Belt Co. recommends the use of chains of less than ½ in. for certain installations, and on the new Stutz Speedway Six a ⅜ in. pitch is used. Paige and McFarlan also employ it. With a chain of smaller pitch there is less motion at each joint and it is claimed that for certain installations a chain of ⅜ in. pitch is quieter and longer lived. The installation on the Stutz Speedway Six employs the back-type chain with automatic adjustment. It is a four sprocket layout, with the chain passing over wheels on the crankshaft, camshaft and accessory shaft and over the automatic adjustment idler.

One tendency which may develop as a result of recent research work is toward lower accessory shaft speed. Gear ratios and engine speeds tend to increase, thereby increasing the speed of the generator shaft, and it is claimed by some of the front end specialists that the accessory shaft speed could be cut down to advantage. This would give a larger accessory shaft sprocket, decreasing the amount of bend in the chain and increasing the angle of chain contact which, of course, is to be desired.

One of the chain companies is now insisting on a minimum of 16 teeth in the accessory sprocket, although it has made one or two 15 tooth installations in the past.

Gears made of such non-metallic materials as Formica, Textolite, Celoron, etc., all of which possess non-resonant qualities and the ability to absorb shocks to a certain extent, are employed on a number of cars. There has been some discussion in the trade during the past year as to whether, when employing a fabric gear, it is better to use it as a camshaft gear or for the smaller gears. Discussions have been carried on through AUTOMOTIVE INDUSTRIES on this subject during 1923. A list of cars whose manufacturers build their own engines is given herewith, showing the type of front end drive employed on each.

THE French Government is reported as having decided to lay down 700 miles of leader cable for guiding airplanes in flight in cloudy or foggy weather. The commercial air lines that are thus to be "electrified" are Paris-London, Paris-Brussels and Paris-Strasbourg.

Better Service Facilities Are Needed in Small Towns

Maintenance needs of small communities are outlined at annual meeting of Automotive Electric Service Association. Dealer-manufacturer cooperation is urged.

THAT there are not sufficient authorized electrical service stations to care for the 15,281,295 cars and trucks registered at the end of 1923, and that there is an urgent need for extension of service facilities in small communities, was one of the chief facts brought to the attention of the members of the Automotive Electric Service Association at their fourth annual meeting held in Chicago Jan. 30-31.

It was pointed out that there are less than 2400 authorized electric service stations, and that although the thickly populated sections are well taken care of, the smaller places are not. It was stated that in New York State, for example, there is one authorized service station to every 2897 cars and trucks, but that another State with about 46,000 square miles area has but six stations to service 103,850, or 17,306 cars each. With 25 per cent of the total registration in 16 States, these have but 612 authorized service stations, while the balance, 75 per cent, or 1700-odd stations, are in 33 States with a total registration of 13,126,642 cars and trucks.

Both the A. E. S. A. and the equipment manufacturers are cognizant of the need for extension of service to the smaller places, and one of the results of the annual meeting of the electric service men was the adoption of a local or sectional campaign, the chief object of which is to extend service. As was stated in the last issue of AUTOMOTIVE INDUSTRIES, sections are to be formed throughout the country to increase the scope of the activities of the A. E. S. A. and to develop service in the small communities. The plan received the unanimous indorsement of the members and the board of directors.

Durham Outlines Policies

The new president, P. J. Durham, New York, outlined the policies for the year. He referred to criticisms of the car and truck manufacturers on the lack of real service in the small places, and held that the big task of the association was to provide satisfactory service in these places. Each member must raise the standard of his service and that of other stations. In referring to the equipment manufacturer, Mr. Durham said the association was pledged to improve the stability of electrical service, and that there would be no policy adopted or effort made for a preferred few, manufacturers or service stations.

Earl Turner, representing the Automotive Electric Association, indorsed the sectional plan, as it would, he said, do very constructive work, as well as effect economies. Better contact between the branch managers of the manufacturer and service representatives and greater cooperation would result in the extension of better service. In speaking of the attitude of the car and truck dealer toward the authorized service station, Mr. Turner said that it was the lack of specialized service that led dealers to render electrical service.

F. A. Oberhue, United Motors Service, expressed himself along similar lines. He asked the very pertinent question as to how the service station expected to sell the car dealer if the electrical service station was not as clean and attractive as the dealer's. Mr. Oberhue urged that effort be made to keep the electrical shop spick and span and to have the men who came in contact with the dealer and customer neat in appearance and courteous in manner. Reference was made also to billing the customer in detail.

Shattuck Analyzes Commercial Car Field

C. P. Shattuck, field editor, *The Commercial Car Journal*, presented a paper and charts analyzing the commercial car field from an electrical service standpoint. He presented statistics in detail to show the growth of the truck industry over a period of years, the trend in capacities and the location as per registration in states. The trend in electrical equipment since 1916 was discussed and shown by charts. The speaker held that the truck field affords the electrical service station wonderful opportunities for business and that service is required 365 days the year.

Mr. Shattuck stressed the lack of dependable and satisfactory service in the smaller places and urged that some plan be adopted whereby the truck owner could be assured that at least minor troubles could be promptly attended to and major repairs accomplished by service stations with the properly trained men and right shop equipment. He cited the criticisms of the truck manufacturer, the dealer and his service manager, and urged that a cooperative plan be formulated to sell these men on the value of the authorized electrical service station service. In commenting upon the back alley shop the speaker held that these and the imitation part will be eliminated by acquainting the dealer and owner with the economics of genuine parts and satisfactory service. The truck owner is interested in any service when that service means less idle time and lower maintenance costs.

V. W. Collamore, Atwater Kent Mfg. Co., presented a very interesting paper on the possibilities of radio for the electrical service station. He said that there appeared to be some question among the service stations as to the advisability of merchandising and servicing radio equipment. In analyzing the subject he pointed out that the service station is the logical one to render the technical service required in the radio field and that the trend toward production by established and reputable makers is quite pronounced. Merchandising and servicing radio is a seasonal advantage to the service station and the contact it affords with the car owner creates opportunity

to sell the owner the standard electrical service. The development of a radio department is quite simple, for invariably a technical radio man will be found in the service station.

In the discussion following, a number of members indorsed the speaker's remarks as to the service and profit angle. Mr. Cohan, sales manager of the American Flatlite Co., read a paper on headlights which included statistics based on the investigations of the Bureau of Standards.

The election of officers resulted in the unanimous choice of P. J. Durham, New York, as president and E. S. Cowie, E. S. Cowie Electric Co., Kansas City, Mo., as vice-president. The new secretary is J. Harry Hearnen, Trenton, N. J., and F. W. Duffee, Toledo, Ohio, was selected as treasurer. G. T. McFarland, New York, was reelected executive secretary. The meeting was attended by 128 members and representatives of twelve manufacturers, making it one of the largest yet held.

Clutch and Gearsets Introduced by Ohio Manufacturing Co.

THREE gearsets and a clutch are to be placed on the market shortly by the Ohio Manufacturing Co. Although these products are conventional in some respects, they have novel features, the subject of patent applications.

The clutch will be made in single and two-plate units. Driven members are of steel and have facings riveted to each side. The driven plate nearest the face of the flywheel is riveted to the splined hub, while the second plate, when used, is attached to a gear ring with internal teeth which mesh with external teeth cut on the outer diameter of the hub flange. Driving plates are slotted to fit over the driving members, A, Fig. 1, the bearing surfaces being quite large and hardened to minimize wear and prevent rattle.

Twelve springs bear against the pressure plate, H, which is provided with six projections containing slots into which the outer ends of the disengaging levers, J, fit. The latter have a fulcrum point with felt pad lubrication on the bolts, D, which are adjustable. Release is accomplished by applying pressure to the hardened plate, L. When this is moved forward, pressure is transmitted to the hardened inner ends of the disengaging levers and the pressure plate is withdrawn.

Nearly all parts of the clutch are made of pressed steel. Driven plates are 10 in. in diameter and have facings 1⅝ in. wide by 5/32 in. thick. A clutch with sufficient capacity for a 3½ by 5 in. six-cylinder engine is said to require about 21 lb. pressure at the pedal for disengagement. Construction of the clutch is such that it can be shipped completely assembled.

Fig. 2 illustrates one of the three new gearsets made by the same company and is more or less typical of all three designs. The other two are, respectively, a smaller three-speed size, with helical gears on the constant mesh set only, and a larger four-speed size. A feature of all three designs is the tubular shifter lever with inclosed reverse latch rod and latch at its lower end. This latch is intended to prevent accidental engagement of reverse gears and is arranged also in such a way as to disengage the idler reverse gear when it is not in service, thus preventing noise at this point.

Shafts are of large diameter and are made as short as possible in order to give rigidity and a compact design. Timken bearings are used regularly, but these are of such size as to permit of the use of annular ball bearings if desired.

In the case of the middle and largest sizes, the second speed as well as the constant mesh gears are continually in engagement; both sets have helical teeth. Two sliding clutches operated by a yoke which turns on trunnions at either side of the box are employed. Bearings are of ample size to take the thrust load of the helical gears, as well as the radial loads.

It is the particular aim of the manufacturers of these gearsets to produce a high-grade unit which will be notably quiet in operation.

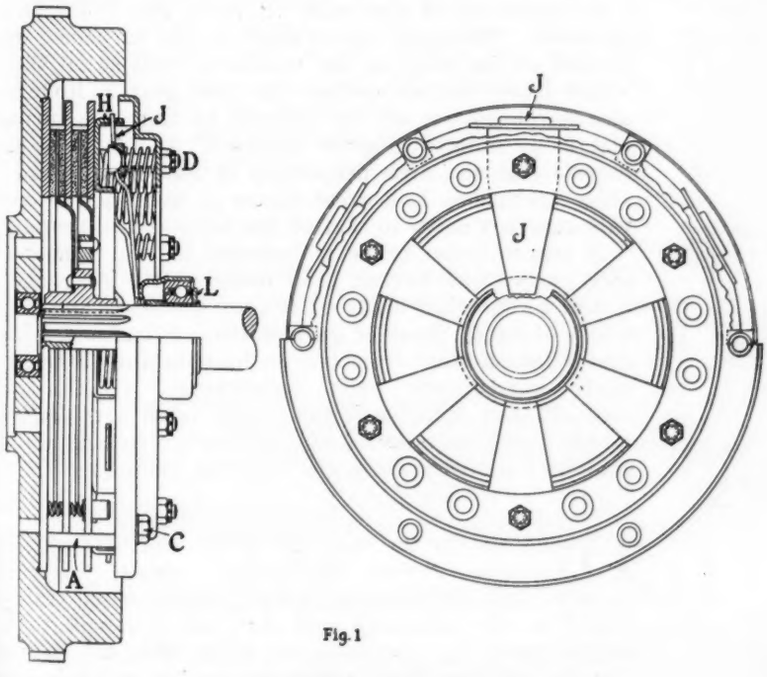


Fig. 1

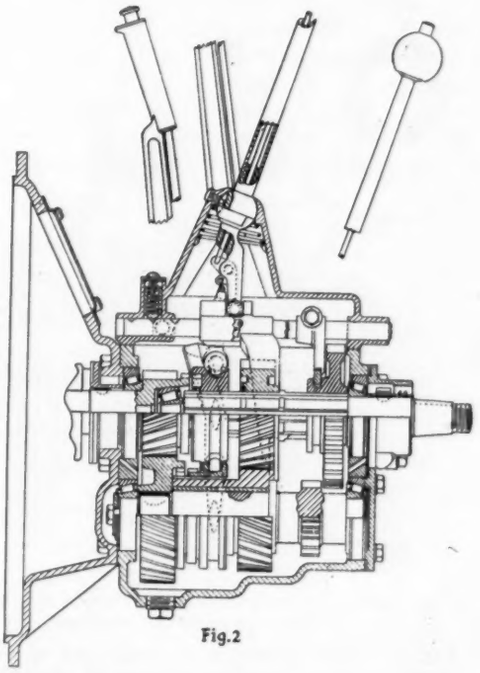


Fig. 2

Sectional views of the new clutch and gearset recently announced by the Ohio Manufacturing Co.

Helical Gears in Constant Mesh Feature of New Transmission

Noise is practically eliminated. Shifting is accomplished by simple system of roller clutches and sliding collars. Angle of step-down gears at front opposite to others on same shaft.

HELICAL gears in constant mesh are used throughout the McCarrell Constantmesh transmission. Gear noise is practically eliminated by this form of gearing, and shifting from one reduction to another is accomplished instantly by a simple system of roller clutches and sliding collars.

As illustrated by Fig. 1, the gear combinations are arranged in the conventional order, the reverse and low being engaged selectively by a common collar at the rear, while the intermediate and direct gears are arranged in a similar manner at the front end of the gear box. The upper assembly is mounted on ball bearings, two-row annular at the front and a single row at the rear, with a bronze bushing for the pilot. The lower shaft consists of the conventional four gears and a sleeve mounted on a fixed shaft with intermediate bronze bushings.

In place of the usual sliding gears, or jaw clutches in the case of the constant mesh type, a roller clutch is fitted at each of the gears of the upper shaft. The hub of the gear is extended to form a cage for six rollers. The part leaves the turning operation in the shop with a full extension hub which is then cross milled to form six equally spaced radial slots. The cage is completed at the outer end by a ring which is held in place by three countersunk cap screws and three dowels. Radial slots are formed in the body of the gear and the inner face of the ring for the purpose of retaining the rollers, which latter have tapered pilot lugs turned on each end. When a gear is not engaged and the shaft is in rotation, centrifugal force throws the rollers to the outer or released position. When it is desired to engage a gear, the intermediate sliding collar is shifted over the cage projection by the usual hand lever, interlocked gate-rod and fork arrangement. In the neutral position, this collar is carried on the cylindrical outer ends of two adjacent roller clutch cages.

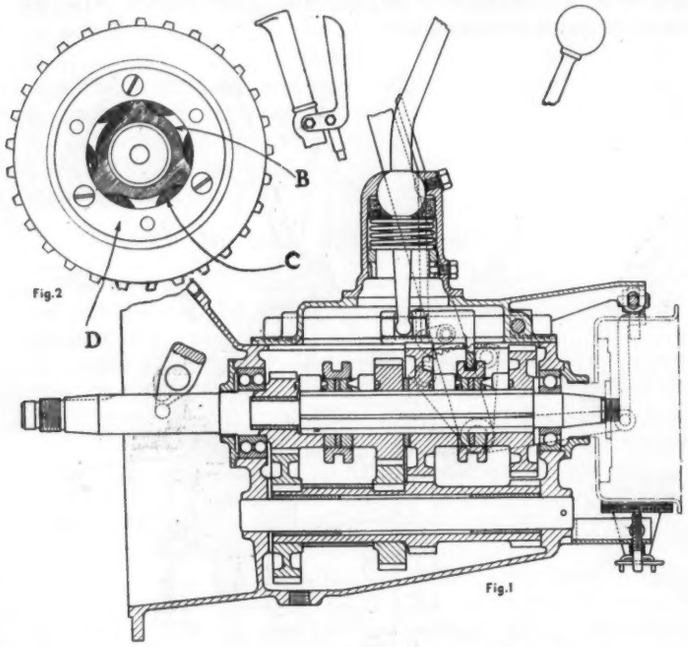


Fig. 1—Longitudinal section showing shifting collars in neutral position

Fig. 2—Cut-out view from front end of tailshaft showing shifting collar and roller clutch in engaged position

As the collar is shifted toward the desired gear it first contacts with the ends of three long rollers and then picks up three short rollers which alternate with the former, forcing all inward into the interstices in the spline shaft. The shaft is machined with three splines; therefore, as the long rollers engage first, about 90 deg. is allowed for pick-up before the entire roller arrangement is jammed closely into the spline shaft. The assembly is shown in this position in Fig. 2, which is an end view. *A* is the gear, *B* is the spline shaft, *C* is one of the six rollers and *D* is the shifting collar. It will be noted from Fig. 1 that the hole in the shifting collar is chamfered at both ends to allow smooth engagement.

Helix Gears All Alike

Helix angles are the same for all of the gears, but the angle of the step-down gears at the front is opposite to all of the others on the same shaft. On the upper shaft, three bronze thrust washers are interposed between adjacent ends of the cages, to provide for the resultant longitudinal thrust. The net longitudinal thrust is transmitted to the ball bearings. End thrust on the lower shaft is taken on a spacer washer located at the front end of the housing.

All gears are of alloy steel (S. A. E. No. 3150) and oil-hardened. The upper spline shaft is also hardened, and is ground on the sides of the splines as well as on the top, which latter surface centers the free gears. Rollers are also hardened but are not ground, as they are turned to size in an automatic screw machine. In fact, the maker asserts that the high proportion of automatic screw machine operations is a great factor in keeping the cost of this gear box down to that of the more conventional type.

A transmission brake is included in the standard design, provisions having been made at the rear end for a direct connected brake of 6½ in. diameter and 2½ in. width of band. Ease of gear shifting is claimed, it being stated that a shift from one position to any other can be made immediately upon declutching. Greater tooth strength and increased life of gear teeth are claimed to result from the absence of clashing action and the fact that no chamfer reduces the effective tooth face.

DISCUSSING the need for better transit facilities in Calcutta, *Indian Engineering* comes to the conclusion that the construction of underground railways would be too expensive and that the city will have to depend upon the extension of street car and motorbus services. Before these extensions can be made, however, much road construction will have to be done.

Combined Electric Generator and Magneto Announced by Robert Bosch

First unit is similar to previous separate designs, but latter is radical departure from former practice. Magneto armature is stationary; magnetic frame is arranged to rotate about it.

A NEW design of combined electric generator and ignition magneto has been developed by the Robert Bosch Magneto Co., Inc., and is being offered in three sizes, with generator outputs of 80, 100 and 130 watts, respectively. The largest unit gives its full output at a minimum speed of 450 r.p.m., while the two smaller ones require 600 r.p.m. In the generation of electric current the two parts of the machine are independent of each other, so that failure of the generator, for instance, does not affect the operation of the ignition magneto.

The generator has four poles and is shunt-wound. Its terminal voltage is maintained substantially constant by means of a regulating resistance which is cut into and out of the field circuit by means of an electro-magnetic vibrator whose coil is connected across the generator terminals. In its general features the generator portion of the new machine is quite similar to Bosch separate generators for automotive purposes, the only constructional difference being in the form of the bearing plate at the magneto end, which serves also for centering and mounting the magneto.

Magneto Has Stationary Armature

On the other hand, the magneto portion of the machine is a radical departure from previous Bosch practice in magneto design. The magneto armature, which carries both a primary and a secondary winding, is stationary, while the magnetic frame, which is of annular form with two opposed poles, is arranged to rotate around it. The magneto field frame is mounted on the tapered end of the generator armature shaft, which obviates the need for separate bearings for the magneto and materially reduces the overall length of the combination.

The interrupter and distributer are mounted on a common shaft, perpendicular to the axis of the rotating annular magnet. Motion is transmitted from the driving shaft to the distributer shaft through helical gears. One advantage of helical gears over the spur gears normally used for the distributer drive is that they operate more silently; besides, it is claimed, the arrangement here used has the advantages that the interrupter and distributer are readily accessible and that it permits of a neat arrangement of the spark plug cables.

Referring to the sectional views herewith, on the tapered shaft end *A* of the generator is carried a non-magnetic disk *E* to which is fitted an annular permanent magnet *C* with two opposed pole shoes *D*. Within the pole shoes is arranged the stationary, shuttle-type armature *F*.

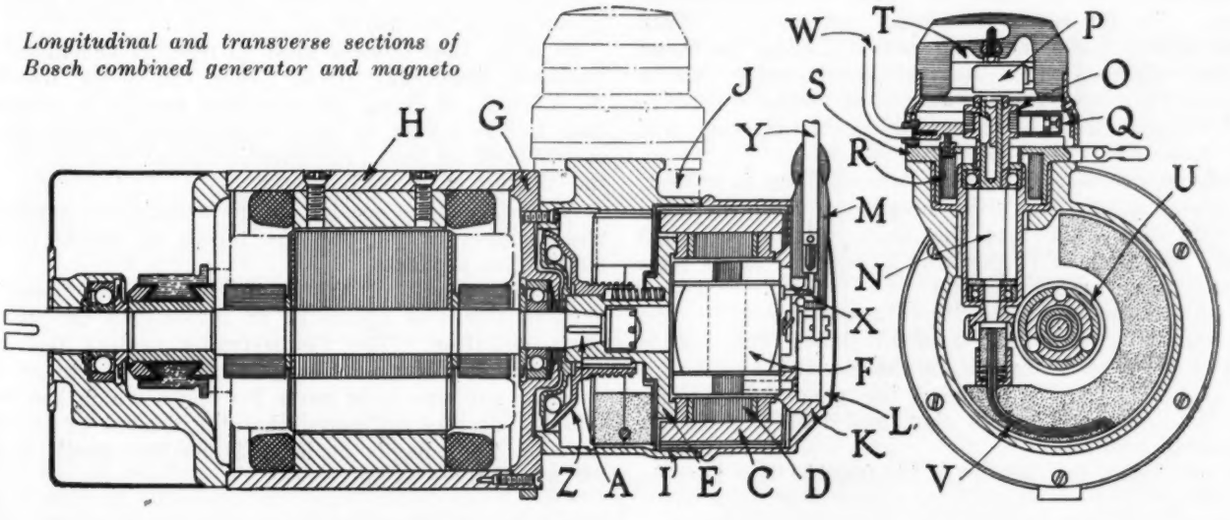
The housing of the magneto is in two parts. A bearing plate *G* secured to the field frame *H* of the generator serves for centering and fastening the magneto. To this bearing plate is fastened that part *I* of the magneto housing which carries the distributer mounting *J*. Part *I* also carries a part *K* to which the armature core is secured. At the outer end the magneto housing is closed by a sheet metal cover *L* and a hard rubber plate *M*.

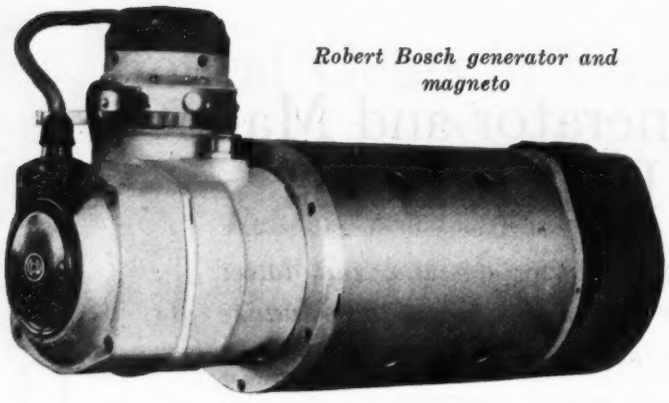
Mounted in ball bearings in the distributer housing *J* is the vertical shaft *N* which carries the interrupter cam *O* and distributer disk *P*. The stationary interrupter *Q* with the condenser *R* is located in a demountable annular housing *S*. On top the distributer housing is closed by the flat dome-shaped distributer disk *T*, which is fastened to the distributer housing with a bayonet joint.

Shaft *N* of the interrupter and distributer is driven through a pair of helical gears, of which the driving gear *U* is mounted rigidly on the hub of the magneto field frame. Both gears are lubricated by means of a wick oiler *V*.

From the stationary armature the current is conducted to the interrupter across the insulating plate *M* through a cable *W*. The high tension current is taken off the sta-

Longitudinal and transverse sections of Bosch combined generator and magneto





Robert Bosch generator and magneto

tionary armature through the spring contact *X* and carried to the rotating distributer disk *P* by the cable *Y*. On the hard rubber plate *M* there is a terminal for the connection of the switch cable.

Bosch combined generators and magnetos are made for automatic timing, hand timing or both. Automatic timing is effected by means of a ball type of centrifugal governor which rotates the interrupter shaft relative to the annular field frame of the magneto. To this end the driving helical gear is arranged so it can slide on the hub disk *E*. Connected to this gear is the ball disk *Z* of the centrifugal governor. With increase in speed the balls of the governor rotate the disk *Z* against the force of a spring. This causes the interupter cam and the distributer disk to move ahead and ignition to take place earlier.

Automatic timing is said to be particularly advantageous with this design of magneto because it is possible to make the centrifugal governor very small, for the reason that it has to develop only slight forces, the mass of the interrupter cam and distributer disk being relatively small.

For the purpose of hand timing the interrupter housing *S* and the distributer head *T* are so arranged that they can be rotated through a certain angle relative to the interrupter shaft by means of a lever secured to the interrupter housing. After loosening a clamp screw, the lever can be secured to the housing in any desired position, which takes care of different arrangements of the control linkage. The motion of the driving helical gear is limited by stops.

The total timing range of the magneto is 36 deg. of crankshaft motion. In case combined hand and automatic timing is used, one half of the total range is controlled by hand and one-half automatically.

In the design of the interrupter, the movable masses have been held to very small dimensions, and therefore are very light, so that the magneto operates faultessly at very high speeds, it is claimed. The interrupter lever is not mounted on a stud but is supported by springs, hence bearing friction is eliminated, and the interrupter is said to be well protected against the ingress of oil.

While the generator and magneto combination is completely inclosed and all current carrying parts are protected against dirt and moisture, provision is made for ventilation of the magneto by vents in the interrupter housing. This obviates the condensation of water and oil vapors and the injurious generation of ozone.

Gear drive through a Bosch flexible coupling is recommended, at crankshaft speed for four cylinder four cycle engines and one and a half times crankshaft speed for six cylinder, the magneto generating two sparks per revolution of its field frame.

The voltage regulator and battery cut-out switch are located within the generator housing at the commutator end, except in the 80 watt model, where they are on top of the generator at the same end, under a cover. Both bearings of the generator and that in the distributer housing are of the ball type.

Dealers Are Determined to Make More Money in 1924

(*Continued from page* 271)

With keener competition against the new cars of medium price in 1923 as compared with 1922 it is interesting to see that not only was a higher average price obtained for used cars but more of them were sold in the same period. Despite the drop of 20 per cent in the price of the average new car sold, used cars averaged 6 per cent more per car than in 1922.

Some of the accomplishments of the N. A. D. A. in promoting better business methods among its membership were described by Lynn M. Shaw, assistant general manager. He estimated that used car losses in 1922 exceeded $200,000,000 including reconditioning, overhead and sales expense. This startled the industry into a realization that it couldn't continue if dealers were to live. Eighty per cent of the mortality in that year was due to used cars.

Periods of greatest prosperity, when selling is easiest, bring most business difficulties because of loose methods. Notwithstanding this fact the third quarter of 1923 showed a reduction of 73 per cent in used car losses compared with same period in 1922.

All dealers should agree, Mr. Shaw declared, on one of the two workable national used car plans. They should try one or the other and get somewhere with it.

The N. A. D. A. has adopted the general principles of the Cleveland certification plan, and dealers generally are ready to adopt it.

Used car losses in 1923 were $66,000,000 less than in 1922. Seventy-three per cent of all new car sales last year involved a used car and it will probably reach 80 per cent this year.

Dealers spent $33,000,000 in advertising used cars last year, Mr. Shaw said. Nearly all of this huge sum went for space in the classified columns reaching only 18 per cent of the market. He asserted that the biggest group of classified ad readers are job hunters. The second largest are hunting places to live. Those in the third group are checking up their ads and those in the fourth group are actual buyers.

In order that dealers most in need of education along business lines may profit from the work which the N. A. D. A. is doing, the directors decided to reduce the dues to $25 a year to those with a gross annual business of $250,000 or less. All dues hereafter will be based on the amount of gross business.

At the business session of the association a resolution was adopted calling for the repeal of excise taxes on automotive products.

At the request of the Pennsylvania state association a committee was appointed to investigate the unsalable parts situation. The Pennsylvania dealers feel manufacturers should give them an opportunity to exchange obsolete and unsalable parts for those which are readily salable. It was estimated that the dealers of that state have on their hands at least $1,000,000 worth of parts for which there is no market.

Present Taxicab Size Defended

Editor, AUTOMOTIVE INDUSTRIES:

My attention has been called to an editorial published in your issue of Jan. 10, under the heading of "Why Not Reduce the Size of Taxicabs." I do not think your editorial would be any fairer if you were to say that all automobiles on the streets should be reduced to the same wheelbase as the Ford, or possibly smaller.

It has been proven in our vast experience and by the rapid growth of our business that the public demand and need is for a taxicab of the comfortable, roomy, five-passenger type that now predominates on the streets of New York City. The amount of taxicab loads in excess of one passenger is greatly increasing, particularly so in localities like New York City, where five people may ride for the same price as one.

The real reason why the small taxicab is not a success is that the short wheelbase makes it hard riding. While it is true that by having the cabs smaller you might be able to get a few more on the streets, yet answer me this, has any locality the right to legislate on the question of personal comfort? Has any community the right to tell a man that he must drive a Shetland pony instead of a real horse?

Your editorial starts off saying, that this suggestion is made by a "volunteer investigator." We do not know who this investigator is, but we feel sure that he is in the employ of some company manufacturing a very small taxicab and we are sure that his suggestion would meet with an avalanche of strong, contrary criticism from the cab-riding public of New York City, who have already shown their preference for roomy, comfortable taxicabs as against the smaller crowded, uncomfortable two-passenger type; in proof of which is the fact that several companies using the small type of taxicab have gone bankrupt and made total failures in New York City.

Suggesting that cabs be made lighter is like suggesting that you take away the protection and safety that manufacturers are striving so hard to build into their taxicabs. A taxicab is naturally subjected to more accidents than any other car and this added weight you refer to is primarily a factor of safety built in for the protection of the passengers. You make the statement that 21 1/10 per cent of all traffic is made up of empty or cruising taxicabs—this figure is extremely favorable, as in most cities it runs approximately 50 per cent, because in ordinary circumstances a taxicab in taking passengers to a certain locality must return empty, and it is only due to the numerous "pick-ups" in New York City that this percentage is held down to such a low figure.

Let the writer suggest that, as a cure for traffic congestion in New York City, heavy trucks and delivery wagons be kept off all city thoroughfares and that other streets be designated as thoroughfares for this class of transportation. Permit the writer to suggest that a city ordinance be passed causing deliveries of merchandise, large loads of one character or another, in certain congested parts of the city, to be made previous to a given time in the morning and after a given time at night, thereby relieving traffic of the real cause of congestion during the hours of the "peak" of the traffic load. It would also be very beneficial should the police regulations of New York City make at least three of the important streets of New York City one-way streets during certain hours of the day.

Taxicabs will exist and continue to multiply in number in any city automatically with the demand that there is for their services, and it is not by suggestions as foolish and impossible as those made in your editorial that traffic conditions can be remedied.

BEN C. HERSHFIELD,
Assistant Director of Sales,
Checker Cab Manufacturing Corporation.

Duco Used on Oakland Show Cars

Editor, AUTOMOTIVE INDUSTRIES:

Inadvertently, of course, you have made a rather ambiguous and harmful statement in your article on the New York show in the Jan. 10 issue of AUTOMOTIVE INDUSTRIES. I refer to the paragraph under the caption "Few Dull Finishes." You say "Even the Oakland line, which was expected to include several cars with a satin Duco finish, lacked anything which approximated this designation."

I believe the casual reader would take from this that the Oakland people were not using Duco. As a matter of fact, every Oakland car in the show was finished with our material. Perhaps the Oakland cars did not agree with your interpretation of a "satin finish." As a matter of fact we find there are as many interpretations of the "satin finish" as there are persons to discuss this type of finish.

It is true, however, that the Oakland people have learned how to produce a much higher gloss with Duco finish than was believed possible when they first adopted it. Still, they contend, and we agree with them, that their finish as advanced today can be classed as "satin finish."

It may be interesting to you to know that three manufacturers have adopted Duco, two of them for their entire production and the other for one model.

MATT. DENNING,
Advertising Manager, Chemical Products Division,
E. I. Du Pont de Nemours & Co.

LARGE quantities of aluminum chloride are used in the petroleum refining industry. This salt converts all unsaturated hydrocarbons into saturated compounds. Frequently this conversion is made by throwing out the excess of carbon over hydrogen in the hydrocarbon, whereupon the carbon blackens the aluminum chloride and forms a coke; gases need not be liberated. The most astonishing consequence of this saturating action is that unstable fuel and lubricating oils made from asphalt-base petroleum yield excellent stable products of good color and odor; in fact, they are almost paraffin-base products.

Low Speed Indicator Developed for High Speed Engines

Device invented by Budapest scientist traces diagram which is representative of large number of succeeding cycles in the powerplant. Influence of sources of error is greatly reduced.

AN indicator for high speed internal combustion engines which traces a diagram representative of a large number of succeeding cycles in the engine has been invented and developed by K. J. v. Juhasz, instructor at the Budapest Technical College.

The device works, in a sense, on the step-by-step principle, a sort of stroboscopic valve being inserted between the cylinder and the indicator proper, whereby the engine cylinder and the indicator cylinder are placed in communication for a very short fraction of each cycle, during which the pressure within the engine cylinder is substantially constant. The piston of the indicator will then assume a position within its cylinder corresponding to this pressure, which permits registering the pressure on the diagram. By changing the phase relation of the stroboscopic valve to that of the engine crankshaft, a complete diagram of the engine cycle can be drawn and the effects of inertia of the indicator moving parts practically eliminated.

The stroboscopic valve referred to is of the general design shown in Fig. 1. It consists of two slides, arranged side by side within a suitable guide, ports being provided in each of the slides and also in both sides of the guide. From the port in one side of the guide connection is made to the cylinder to be indicated, and from that on the other side, to the cylinder of the indicator, which latter may be of the ordinary type as used for low speed engines. With the two slides in a definite position, there is a free passage for the gases from the engine

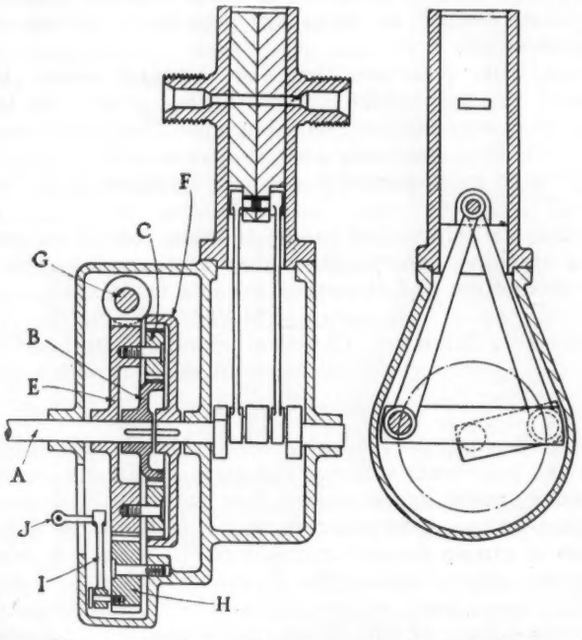


Fig. 1—Stroboscopic valve and phase-shifting mechanism

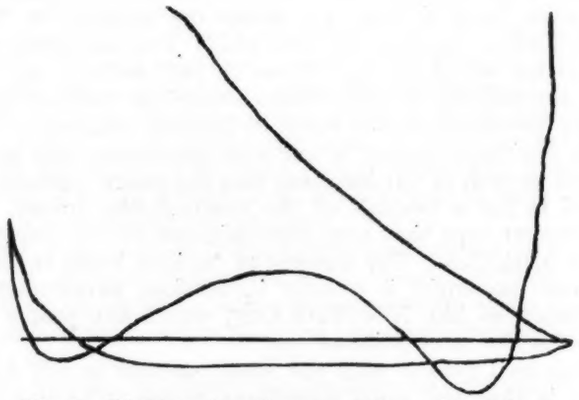


Fig. 2—Light-spring diagram taken with Juhasz indicator

cylinder to the indicator cylinder. This registering of all of the ports occurs only once during each revolution of the crank operating the slides, and crank angles and port locations are so determined that this occurs when the slides are moving at their maximum speed, so that the duration of the opening is as small as possible.

The valve is driven positively from the engine crankshaft through a phase-shifting mechanism which is combined with the stroboscopic valve and is also shown in Fig. 1. This phase-shifting mechanism consists of a planetary reduction gear of the internal gear type. Referring to the illustration, the shaft A, which is connected to the engine crankshaft, carries a spur pinion B meshing with two planetary pinions C, capable of revolving on studs in the toothed disk E, which is mounted loosely on the shaft A. Planetary pinions C also mesh with the internal gear F, which has twice as many teeth as pinion B and is keyed to the crank of the stroboscopic valve. Hence this crank will rotate at one-half the speed of the engine crankshaft and make one revolution for each complete cycle of the engine.

Only One Communication Per Cycle

The two slides of the valve are connected to crankpins located almost opposite each other, and it might seem that there would be communication through the valve twice per cycle, once when either slide moves up and again when it comes down. This, however, is prevented evidently by making the angle between the two cranks slightly less than 180 deg., so that every second time the ports in the slides register with each other they do not register with the ports in the guide.

Meshing with the toothed disk E is a worm G, by means of which the disk can be revolved around its axis and the phase relation of the stroboscopic valve to the engine cycle changed. The toothed disk also meshes with the spur gear H, having one-half the number of teeth, and this spur gear will therefore rotate at crank-

shaft speed; hence the motion for the indicator drum can be derived from it. For this purpose a crankpin is secured into the side of gear H, which carries a connecting rod I, the free end of which carries a pin J moving in a slot in the housing of the phase-shifting mechanism. It is only necessary that the ratio of crank throw to connecting rod length of this reducing mechanism be the same as that of the engine in order to accurately reproduce the piston motion on the drum. In taking indicator diagrams the phase-shifting worm can be operated either by hand or automatically, as slowly as may be desired.

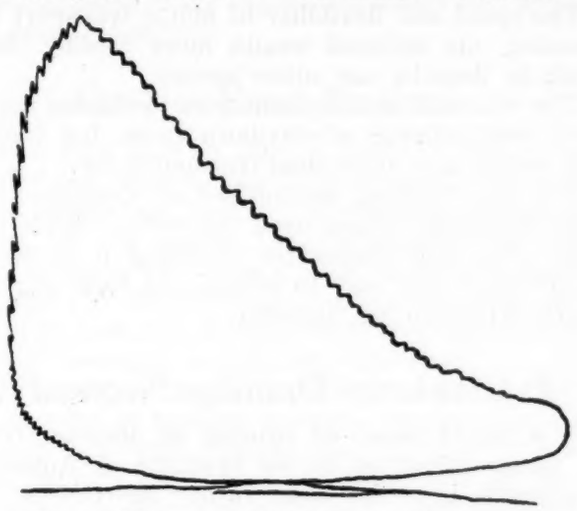


Fig. 3—Diagram taken from engine running under full throttle on tetralit-benzol at 1800 *r.p.m.*

Following are some of the advantages claimed for this form of indicator:

1. The indicating instrument is operated entirely mechanically. It is substantially built and capable of withstanding ordinary usage in the test room. Its operation does not involve the manipulation of optical, photographic or electrical devices, and therefore does not call for special knowledge in these different branches. The diagram is traced with a pencil to a suitable scale on a paper card and can be observed while being taken.

2. The springs are interchangeable and strong and weak spring diagrams can be taken at short intervals. The atmospheric line can be traced. In the case of scientific investigations, where the highest degree of accuracy is desirable, a sensitive pressure gage or a liquid column can be substituted for the indicator.

Sources of Error

3. The influence of the various sources of error of the indicator is reduced. As a diagram is traced during several hundred cycles, the combustion chamber volume is not increased by the entire volume of the indicator, but only by a small fraction of same. Only the volume of the connecting tube between the cylinder and the stroboscopic valve is added entirely to the cylinder volume, but this tube can be made short. Furthermore, the pressure in the indicator is equal to that obtaining in the combustion chamber during the phase of the cycle being investigated, but the temperature in the indicator is quite low. In consequence, the errors ordinarily resulting from high temperatures are eliminated in this case.

4. The diagram obtained represents a mean of all of the cycles covered by the duration of the test, consequently it forms a more dependable basis for judging the operating qualities of the engine than where only a single cycle is traced.

5. The diagram can be traced either in the direction of the cycle or contrary to it, and the diagrams obtained will be influenced slightly by the friction in the indicator. Hence the true diagram lies between the two obtained.

The Juhasz indicator has been placed in production by Lehmann & Michels of Hamburg, indicator manufacturers. For the above information on the new instrument we are indebted to Auto-Technik.

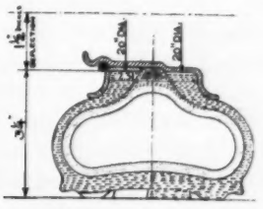
Two New Tires Developed in England

TWO British tire firms recently have introduced systems of construction which differ from the conventional type. One of these firms is the North British Rubber Co. Its new production is termed the "Air Sprung" tire, and is intended for 40 to 50 per cent lower pressures than usual, and for given loads is of greater sectional diameter. It is of the straight-sided type, made for 20-in. wheel diameter only, with two rim sections and three tire sizes which, it is claimed, will serve to equip every type of passenger car chassis without altering existing gear ratios or standard chassis parts.

Apart from the means of attachment, by a detachable edge rim, the principal deviations from normal lie in the design of the tread and the air tube construction. The former, it is claimed, provides three distinct "self-adjusting" treads, the main central portion and a series of rectangular studs at each side which come into use only when the tire is operating under maximum load.

This design, it is said, enables low inflation pressures to be used without creating an acute angle in the tire wall. It is claimed that skidding and fuel consumption are reduced and that no ill effect or heaviness is felt in the steering. The air tube has attached to its inner circumference an unstretchable extension, which is claimed to keep the casing edges in place and to prevent nipping in assembly and lifting away from the rim when the tire as a whole is deflected to its maximum extent, either inflated normally or deflated.

The other new tire is put out by the Rapson Co., which last year ran a set of four tires in an officially observed test, each covering approximately 40,000 miles. The new model has two non-skid treads, one under the other, the dual tread being rather thicker than the ordinary single



Sectional view of air-sprung tire

Rapson tire with double tread

tread; it is built up in an unvulcanized state, a special white compound being used to fill up the indentations made in the formation of the inner tread.

This scheme is intended to bring into use a second non-skid tread when the outer one has worn smooth, the white compound then falling out of the grooves.

The Rapson tire for both models incorporates the so-called "deflector" air tube, which has a thickened tread with shallow circumferential grooves at each side, the effect of which, it is claimed, is to reduce the risk of puncture.

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Taxes on Individual Transportation

EVERY motorist and every man engaged in the automotive industry owes it to himself to tell his representatives in Congress why the discriminatory excise taxes on automotive products are a real levy upon transportation. The bills introduced by Senator Edge and Representative Clancy, calling for a repeal of the imposts, will not be passed unless there is an unmistakable public demand. These taxes probably will not be wiped out entirely at the present session, but there is a strong probability that some of them will be eliminated if "the voice of the people" is heard unmistakably. Here are some arguments, ready made, against tax on transportation:

Motor vehicles transport six times as many persons in a year as the railroads and they carry 90 per cent as much freight.

Motor vehicles are relieving the railroads of unprofitable short hauls and speeding deliveries by lessening terminal congestion. Ultimately this will make possible lower freight rates.

Civilization is measured by the freedom of transportation. When it is throttled, business stagnation follows.

While the railroads have developed many parts of the country, motor vehicles are intensively developing every foot of it and adding tremendously to land values.

Motor vehicles have made profitable the farming of millions of acres of land shut off from markets before their advent.

Motor vehicles have dotted the land with suburban homes and given millions of people pure, health-laden air.

The speed and flexibility of motor transport is increasing our national wealth more rapidly than it could be done by any other agency.

The railroads and the industries producing luxuries have been relieved of war-born taxes, but they are still levied upon individual transportation.

The tax framing committees of Congress admit that the burden placed upon the motor vehicle is unjust. The only excuse for retaining it is that the excise taxes are easy to collect and they aggregate nearly $150,000,000 annually.

Is Crankcase Drainage Necessary?

IN a recent issue we printed an abstract from a paper presented to the Institute of Automobile Engineers, in which some rather unorthodox views were expressed on the subject of lubrication. The conclusions were drawn that there is no material difference, so far as fuel consumption, oil consumption and carbon deposition are concerned, between low-priced and high-priced oils and that periodical draining of the crankcase is unnecessary and wasteful. These views were based on practical and extensive tests and, therefore, had a good foundation, but it is well to point out that the operating conditions under which the tests were made were somewhat unusual and that the conclusions arrived at do not necessarily apply in other cases.

Many passenger cars in this country are used under conditions such that their engines seldom get up to what might be called normal working temperature. This holds true where short trips up to 4 or 5 miles are made at a time, and especially in the case of engines with thermo-siphon circulation, which have a relatively large water capacity, and in winter time.

When running under the conditions described, the oil level in the crankcase does not fall at all, or at most very slowly, showing that there is a great deal of crankcase dilution, whereas if the same car is used for long tours it may be found that as much as a quart of oil can be added every day to make up for loss. In the latter case there is little danger of the oil supply losing its lubricating value through dilution, whereas in the former there is absolutely no doubt of this. The proper care of the lubricating system therefore varies with the conditions of operation.

The tests detailed in the paper referred to were made, we learn, on motor buses with electric drive. Therefore, not only were the engines kept running continuously practically all day long, but the nature of the load was such that they were never pulled down to low speed by heavy torque. From an anti-dilution standpoint the conditions therefore were almost ideal. Another factor that undoubtedly helped to make the periodic draining of the crankcase unnecessary is

that the vehicles were operated on the streets of London, paved for the most part with wood blocks and asphalt, hence there was much less chance for gritty dust getting into the engines with the carbureter air and the crankcase inhalations than in the case of vehicles operating over country roads, and especially earth roads.

In view of the above, while the results of the tests quoted are instructive, it is well not to lose sight of the limited scope of the conclusions which may properly be drawn therefrom.

Contact Point Materials

FOR a long time an alloy of platinum and iridium has been regarded as the best metal for electric contact points, and it offers the greatest resistance to erosion by the sparks. Unfortunately, the chief source of platinum is the Ural Mountains in Russia, and since the revolution in that country it has been difficult to meet the demand for this metal, so that it has been necessary to look for substitutes.

In this country the place of platinum and platinum-iridium alloy in breaker contacts has been taken by tungsten to a large extent. The latter metal has a higher melting point than platinum, still its life in this service is said to be much less. This probably is due to the fact that tungsten is more readily oxidized when raised to a high temperature. It is known that tungsten oxidizes freely at red heat, and while the points do not reach a temperature such that a glow can be observed, minute particles evidently get sufficiently hot to become oxidized and then rapidly wear away.

This, of course, does not mean that tungsten points do not give a satisfactory life. In view of the very much lower price of tungsten, it is far superior when viewed merely from a cost standpoint. From another point of view, however, platinum contacts are better, because the oxidizing effects noted with tungsten are likely to be accompanied by irregular operation of the points and by consequent misfiring.

Too Many Farmers

MANUFACTURERS can meet their own needs for workers and at the same time relieve the over-population which exists on farms in some sections by recruiting labor from rural districts, according to a prominent government official. This executive, who is recognized as an authority on economic conditions, said the other day that manufacturers ought to talk less about the need for increased immigration and take about 25,000 workers from North Dakota and surrounding States so that the present excess farm production there would be cut down.

The idea is a bit startling in view of the "back to the farm" propaganda which has flooded the country for several years. Conditions apparently have changed, in some areas at least, and there are more farmers than are needed to produce the nation's food supply.

If this Government official has sized up the situation correctly, the manufacturing industries have a chance not only to get some additional workers, but also to better rural conditions and thus improve the farm market.

Watch Fabric Body Developments

A WIDE use of fabric bodies is among the possibilities for 1925 passenger car models upon which many companies now are working. Extensive tests both in this country and in Europe appear to have established the feasibility of this type of construction and beyond this it offers a number of advantages as compared to steel.

J. Harry Main of the General Motors Advisory Staff, made the prediction in AUTOMOTIVE INDUSTRIES a few weeks ago that the greater use of fabric bodies probably will be the most important development of the year in passenger car construction. This, together with the information from our French correspondent that the Fisher Body Corp. recently has had shipped to it from Paris a sample Weymann fabric body and that the Yellow Taxicab Co. has secured a license for construction of such bodies, is sufficient evidence that some important American manufacturers are giving the fabric body serious consideration.

Among the advantages claimed for fabric bodies as compared to steel and steel panel types may be mentioned the following: decreased weight, relative quietness in operation, practical elimination of painting operations on body, increased durability of finished surface, marked decrease in cost of tool and die equipment, elimination of bulky and expensive presses, shears, riveters and spot welders for sheet metal work, smaller lumber requirements for body frame, comparative ease of cleaning without scratching, lower repair costs and decreased expense of changes when variation in body styles are desired.

This impressive list is offset to some extent by disadvantages, not the least of which will be the need for radical changes in manufacturing methods and equipment. Much the same can be said, however, for any marked change from conventional practice and this would not stand in the way once it is agreed that the advantages of the new form outweigh the disadvantages. Anything which tends to produce a finish which is more durable and easier for the owner to care for is deserving of serious consideration.

First cost, at least for cars in the lower price classes, presumably will be the determining factor, once the subject of suitability for all classes of service is established beyond question. It is claimed that cost figures will run about the same as for steel panel construction, but no final answer on this score will be forthcoming until large scale operations are undertaken and manufacturing methods have undergone the same refinement as those for building this type of bodies now in general use.

Fabric bodies are highly promising and can no longer be passed by with a casual observation that they are impracticable. Those who refuse to give them serious consideration may wake up some morning to find the other fellow several strides ahead in an effort to give the user something better suited to his needs than the orthodox body of today.

SHOWS PROVE STIMULATING TO SALES

CONDITIONS in the automotive field have changed very little from last month. The New York and Chicago shows have stimulated buying in the trade and in some of the larger centers. New cars and new models are occupying an area of considerable interest, but buying, from the public, has not been delayed in consequence of the appearance of these elements.

Territorially the conditions remain much the same, with the greater sales possibilities in the northern industrial area for immediate consideration, although all sections are in good condition.

Used car stocks are not increasing to any extent, except in a few localities.

Truck sales are increasing and inquiries for trucks indicate improved prospects.

Dealers generally expect good spring business from orders now on the books.

Closed cars continue to show majority interest.

The strong features of the market are:

(1) Continued good demand for new cars.
(2) Good general business conditions and outlook.
(3) Favorable comparative car values.
(4) Open season in many localities.

The weak features are:

(1) Increase in used car stocks in some localities.
(2) Increase in repossessions in some sections.
(3) Decreasing value of cars for trade-in purposes.
(4) Spotty condition of buying in some sections.

The weak features of the market are not important. The effects are too slight and scattered to have any bearing on the general volume of business. There are greater difficulties in the sale of high-priced cars and the proportion of open models is less than usual.

Credit conditions are not quite so good in some quarters.

Generally business prospects for the immediate months are good—very good.

Reports indicate that sales position is strongest in the East, industrial Middle West and Far West, while the sales prospect is weakest in the Southeast.

Conditions in chief distributing centers as reported by correspondents of AUTOMOTIVE INDUSTRIES are as follows:

January Reported Good Selling Month in Many Cities

New York

NEW YORK, Feb. 5—January showed no appreciable change in the strong, steady market for motor cars in the Metropolitan district. While well satisfied with the volume of business developed by the New York show early in the month, the dealers and distributors were not disappointed when the exposition failed to drive January car sales into a sharp upward curve.

Sales, generally, were 20 to 40 per cent ahead of January, 1922, and slightly better than December, 1923, which was a particularly good December. The remarkably strong market is attributable mostly, the dealers believe, to the mild weather and strong public confidence in 1924 business prospects.

Wholesale departments reported particularly good January sales, indicating that suburban dealers are stocking in anticipation of early Spring business.

Closed cars ranged from 40 to 90 per cent of the total January sales, and orders for February delivery indicate that the demand will continue into Spring at several points higher than the percentage attained a year ago. It will be remembered that the Sport Model figured strongly in the merchandising of several lines last Spring and was probably responsible to some extent for the lower percentage of closed car sales than indicated for this Spring.

The used car market, although slow, is not nearly so quiet as in former years and there are few if any alarming accumulations in dealer establishments. In most instances where they are accumulating they do not constitute a strong menace, as they have been obtained at prices that will enable the dealers to sell them next Spring—and at losses much smaller than in previous years.

The truck market has been normal for this time of year.

Los Angeles

LOS ANGELES, Feb. 5—About the only effect of the national automobile shows on retail trade in this locality has been to set the public guessing. So much has been printed about new cars seen for the first time at national shows that many prospective purchasers, according to dealers, declare they will not buy until they have an opportunity to see the changes for themselves. Heavy advertising of new makes of cars which have no representation among dealers here tends to add to unsettled conditions.

It is estimated that January registrations exceeded those of last year by about 20 per cent but congestion in the motor vehicle department is so bad that records are not available.

The used car market is in a peculiar situation. Those dealers whose deliveries have not kept pace with orders are trying to discourage trade-ins. Values on old models are placed so low that owners are refusing to accept the allowances offered.

Chicago

CHICAGO, Feb. 5—Having as an opening wedge the greatest show in Chicago's automobile history, the spring buying season has been ushered in with an unusually high volume of orders. The show, naturally, produced the greatest number of prospects for low and medium priced cars, but there appeared to be a good demand for high priced makes.

Boston

BOSTON, Feb. 5.—Sales conditions were stimulated following the New York show, and it is expected that a further impetus will be given now that Chicago has held its exhibit.

With all the rest of the section closed tight, dealers plan to make Washington's Birthday the biggest ever as a pre-show exhibition. That will bring them into March with its show, so full of confidence that it will mean putting over an exceptionally large number of spring sales. Meanwhile the sales of used cars are going along very well with those organizations that have been making a drive to get rid of their stocks. Sales for present delivery are being maintained at a reasonable average. What is true of Boston is also true of the outside territory.

Columbus

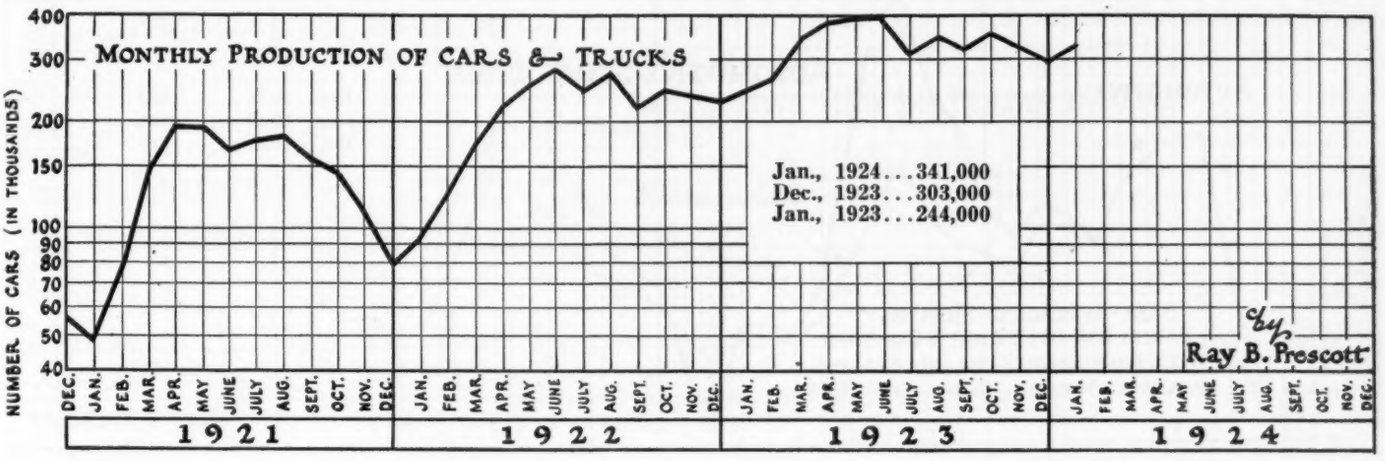
COLUMBUS, Ohio, Feb. 5—January business among the retailers of passenger cars in Columbus and central Ohio territory has been brisk in many respects. In fact the volume was much better than that of the last two months of 1923.

Business conditions generally are good and this is being reflected in the demand for cars. The demand tends largely toward cars costing from $800 to $2,400, although higher priced cars are selling fairly well.

Used cars have been moving better than formerly and there is not as large an accumulation on the market. A contributing factor is the fact that dealers are standing back of their product better.

(*Other conditions on page* 305)

MORE SHIPMENTS NOW MADE BY RAIL



Driveaway Movement Reported Last Month Gained Only Slightly

NEW YORK, Feb. 5—Shipping figures compiled by the National Automobile Chamber of Commerce which give an estimated production of 341,000 cars and trucks for January also indicate that the railroads are functioning so well that manufacturers are doing everything possible to send their product to dealers by rail. Carload shipments for January increased to 43,000 from 34,984 in December, while driveaways gained only slightly.

The traffic department of the N. A. C. C. has been encouraging manufacturers to ship by rail instead of driving the cars over the road because of the cooperation which is being given the industry by the railroads in the way of prompt service and the building of many extra freight cars to take care of the increased production. There have been few complaints of late from the factories over rail service. They have been able to get all the freight cars needed and there have been few delays en route.

While the factories are doing everything possible to help out the railroads, they are not entirely in control of the situation. The dealers really have the say as to whether the cars shall be sent by rail or over the road.

Some of the dealers have driveaway organizations that have been so perfected that they operate as regularly as do the railroads and dealers do not want to break these up. They fear that severe winter might bring about delays in delivery that would be fatal at this time of the year when so many retailers are stocking up for spring business.

Car and Truck Production in January Reached Total of 341,000, According to Estimates Made by N. A. C. C.

NEW YORK, Feb. 5—Shipping figures compiled by the National Automobile Chamber of Commerce for January give an estimated production of 341,000 cars and trucks.

The following table gives the statistics for January of 1923 and 1924:

	Output		Carloads		Driveaways		Boat	
	1924	1923	1924	1923	1924	1923	1924	1923
January	341,000	243,539	43,000	35,228	30,000	30,031	700	728

Factory shipments for the other months of 1923 and 1922, and output for 1923 follow:

	Output		Carloads		Driveaways		Boat	
	1923	1922	1923	1922	1923	1922	1923	1922
February	276,934	122,521	36,165	19,636	43,613	10,173	882	180
March	355,030	172,984	44,983	27,753	62,988	16,917	1,908	560
April	382,695	219,864	46,095	31,334	60,467	22,381	5,027	2,960
May	394,088	256,559	45,397	33,416	62,346	28,827	12,812	7,406
June	378,507	289,351	40,281	34,230	59,099	33,857	13,492	7,737
July	327,993	247,132	32,623	29,116	46,837	28,100	10,131	7,030
August	345,202	274,184	38,319	32,817	45,958	36,768	10,053	10,104
September	327,549	207,156	35,986	26,335	39,653	30,177	8,463	8,118
October	365,189	239,361	42,236	27,100	37,947	35,203	7,663	7,605
November	312,987	237,301	38,133	27,232	32,859	27,376	6,413	5,070
December	303,143	228,364	34,984	27,244	27,608	26,743	4,000	1,307

Motor vehicle production segregated as to cars and trucks is as follows:

1923	Cars	Trucks
January	223,819	19,720
February	254,773	22,161
March	319,770	35,260
April	344,639	38,056
May	350,410	43,678
June	337,362	41,145
July	297,330	30,663
August	314,373	30,829
September	298,911	28,638
October	335,023	30,166
November	284,921	28,066
December	275,268	27,875
1924		
January*	307,000	34,000

* Estimated.

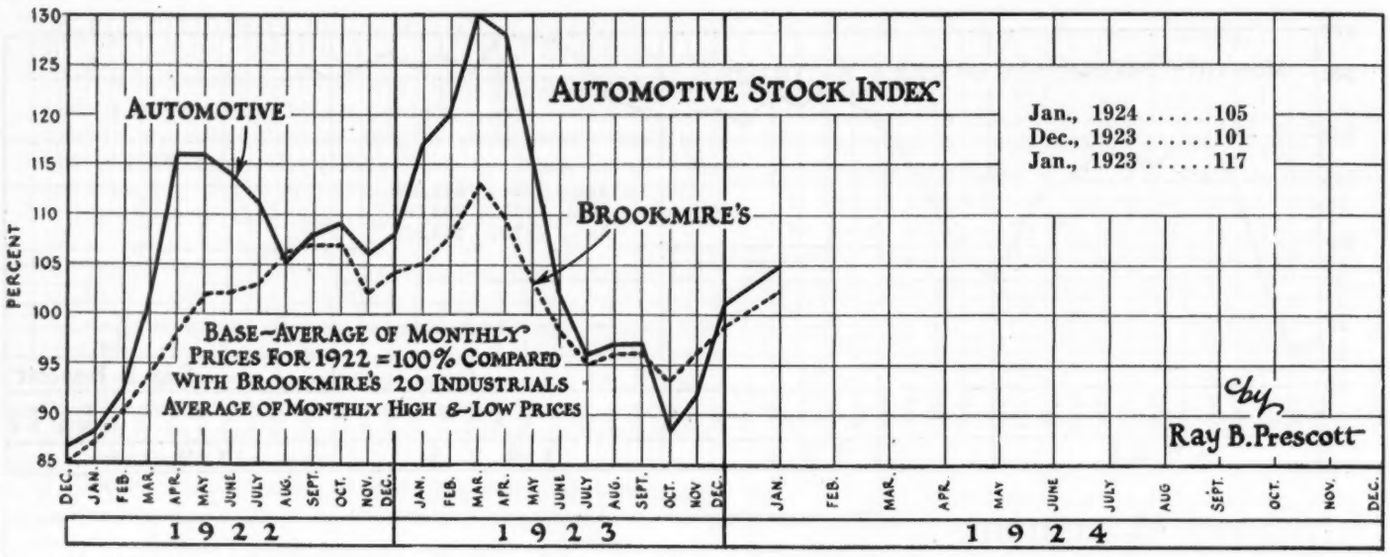
Detroit Sales Conditions

DETROIT, Feb. 5—Sales at retail during the Detroit show, held in January, ran high for dealers handling standard lines, with only a scattering of business in other lines. Not only were sales high, but a large percentage of them were for immediate delivery, with a considerable number of bookings for delivery later. Enrollment of prospects was large, and there is every indication of good business in February and the spring months.

The used car situation has cleared up nicely, and though a large part of business at the show and during January involved trade-ins, dealers in standard lines are declared in better shape as regards used cars than they were this time a year ago. Used cars outsold new cars in December, due to concentration by dealers on moving their used car stocks. This was achieved principally by adding used car salesmen. As a result dealers were in good shape to handle sales at the show involving trade-ins.

Business in the State territory is expected to open up strongly with the advent of the shows. State dealers express complete confidence in business possibilities during the early months of the year. The used car situation is not as good through the State as in Detroit, but is not a matter of particular concern.

AUTOMOTIVE STOCKS KEEP MOUNTING



New York Exchange

	Dec.4	Dec.31	Feb.5
Ajax Rubber	6	7⅛	8¾
American Bosch	33	35½	34½
American La France	11⅜	10¾	10⅝
American La France pfd.	93	91	94½
Case, J. I.	18	22½	25
Case, J. I. pfd.	66	68	75
Chandler	54	66¼	64⅜
Continental Motors	7	6⅞	7½
Eaton Axle & Spring	24½	23⅛	23¾
Electric Storage Battery	65	60	61
Emerson-Brantingham	¾	1⅛	2
Emerson-Brantingham pfd.	6½	8	13
Fisher Body	158	165	175
Fisher Body of Ohio	98	97	97½
Fisk Tire	7⅞	8	9⅛
Gardner Motor	6½	5⅞	5¾
General Motors	13¾	15	16
General Motors pfd.	81½	81	82
General Motors 6%	81½	80½	82⅜
General Motors 7%	96	98½	98½
Goodrich, B. F.	22⅛	22	24½
Goodrich, B. F. pfd.	74¼	72	76
Goodyear Tire pfd.	41	39¾	42¾
Goodyear Tire pr. pfd.	90⅝	88¼	91
Gray & Davis	7½	7⅜	8¼
Hayes Wheel	37¼	40	51⅞
Hudson Motor Co.	26¼	27⅜	27¼
Hupp Motor	22½	15⅝	16½
Indian Motorcycle	18⅞	....	25
Inter. Harvester	76¾	77½	86¼
Inter. Harvester pfd.	105¾	106½	107½
Kelly-S Tire	31¾	32⅛	28½
Kelly-S Tire 6% pfd.	73	75	73
Kelly-S Tire 8% pfd.	84	85	83
Kelsey Wheel	88	96	97
Kelsey Wheel pfd.	101	103	106
Keystone Tire	3	3⅛	3¼
Lee Rubber	14	14	14⅛
Mack Truck	84	90¼	89
Mack Truck 1st pfd.	93½	95½	87
Mack Truck 2nd pfd.	87	88	89
Marlin-Rockwell	6	7¾	11
Martin-Parry	30¾	35⅝	34½
Maxwell Motors A	47	49½	53
Maxwell Motors B	12¾	13½	14¾
Moon Motors	25¼	25	25¾
Mullins Body	13½	12¾	14¼
Mullins Body pfd.	89	....	89
Nash Motors	90	99	106
Nash Motors pfd A	97½	97	98
Ohio Body & Blower	1½	2¼	3¼
Packard	12	12½	11¾
Packard pfd	91½	92⅛	94
Parish & Bingham	11½	13⅛	14¾
Pierce-Arrow	8¾	8¾	10⅜
Pierce-Arrow pfd.	24	26	28
Pierce-Arrow pr. pfd.	63¾	62½	66¾
Reynolds Spring	24	20¾	18
Spicer Mfg.	14	15½	16½
Spicer Mfg.	85	88	88½
Stewart-Warner	88⅜	91⅛	94
Stromberg Carbureter	85	79½	80¾
Studebaker	104	106½	105
Studebaker pfd	115	115	110
Timken Roller Bearing	37¼	39¼	40¾
U. S. Rubber	38½	37½	38¼
U. S. Rubber 1st pfd.	89½	89½	86½
White Motor	51½	55¼	56¾
Willys-Overland	7⅝	10⅝	12¾
Willys-Overland pfd.	71½	82	84½
Wright Aero	12⅜	13	11¾

Detroit

	Dec.4	Dec.31	Feb.5
Auto Body	....	....	1½
Columbia Motors	....	⅛	....
Continental Motors	7⅛	6⅞	7½
Edmunds & Jones	35	....	42
Federal Truck	19	....	....
Ford of Canada	392	422	464
Hayes Mfg.	1⅞	1⅝	2½
Hoover Steel Ball	10	....	....
Motor Products	165	....	....
Motor Wheel	10	....	10¼
Packard com.	12⅛	12⅝	11⅞
Packard pfd.	91½	92½	93½
Paige	22⅜	15¾	17
Reo	17⅜	17¼	18¼
Timken-D Axle com.	7¼	7	7⅛
Timken-D Axle pfd.	....	....	85

Chicago

	Dec.4	Dec.31	Feb.5
Bassick Alemite	36½	36	46¼
Borg & Beck	26½	....	29¾
Chicago Coach pfd.	90¼	88	....
Continental Motors	7⅛	6¾	7⅝
Earl Motors	....	....	⅛
Eaton Axle & Spring	....	....	24
Gill Mfg.	18½	18¾	17¼
Hayes Wheel	38⅛	....	52½
Hupp	22¾	17¼	16¾
McQuay-Norris	19¾	....	....
McCord	33	....	37½
Reo	17⅜	17¼	18¼
Reynolds Spring	25	....	18
Stewart-Warner	88½	91	95
Yellow Mfg.	96½	95	92

Philadelphia

	Dec.4	Dec.31	Feb.5
Electric Storage Battery	65½	....	61

Cleveland

	Dec.4	Dec.31	Feb.5
Eaton Axle & Spring	24	....	....
Firestone	65	68	....
Firestone 6% pfd.	92	90	....
Firestone 7% pfd.	90½	88	....
Goodyear	9⅛	8¾	10¾
Goodyear pfd	40	....	43
Jordan pfd	260	....	93½
McGraw Tire	⅛	....	....
McGraw Tire pfd.	⅜	....	....
Miller Rubber	66	....	....
Miller Rubber pfd.	89	....	....
Peerless Motors	29	23	....
Sparks-Withington	23	....	....
Stearns, F. B.	19½	....	....

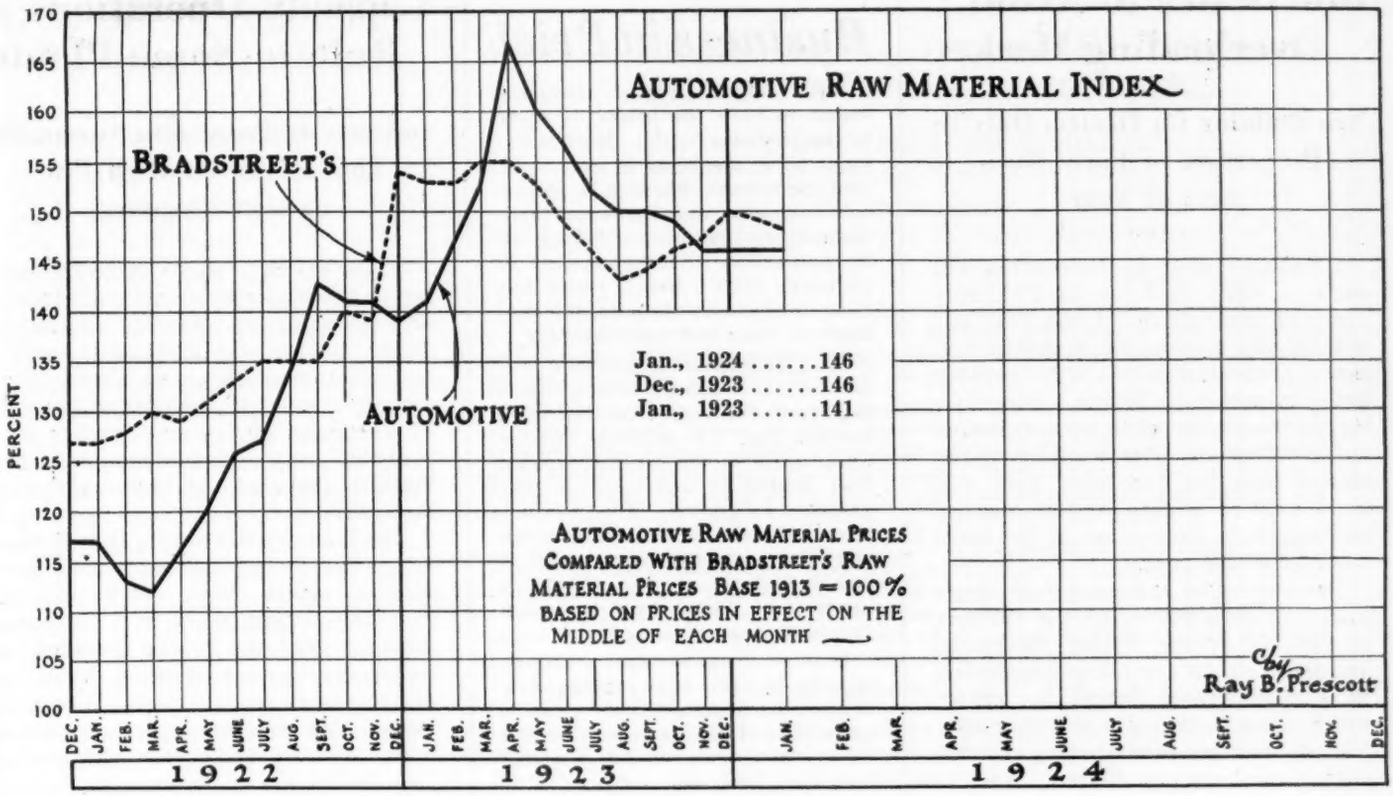
Boston

	Dec.4	Dec.31	Feb.5
Gray & Davis	7½	7⅞	8
Greenfield Tap & Die	15	....	14¼
Hood Rubber	53	53	50½
Parish & Bingham	12	....	....
Simms Magneto	½	....	....

New York Curb

	Dec.4	Dec.31	Feb.5
Aluminum Manufactures.	25	....	....
Cleveland Motors	21	....	....
Cleveland Motors pfd.	....	....	....
Columbia Motors	....	50	....
Dort	2⅛	....	....
duPont Motor	3	....	....
Durant Motors	25	35	31¼
Durant Mot. of Ind.	7⅞	10½	....
Ford of Canada	391	....	464
Goodyear Tire	9	9	10⅞
Hudson	24	....	....
Hupp	....	17	....
Kelsey Motor	1½	....	....
Motor Products Corp.	....	....	77
Motor Products pfd.	44½	47¼	....
Motor Wheel	9½	....	....
Paige Detroit	....	....	17¼
Peerless Motors	28	24	....
Reo Motors	17⅜	....	18¼
Roamer Motor	5	....	....
Stutz	9	9½	11⅞
Timken-D Axle	7	6½	....
Willys Corp. 1st pfd.	5⅛	9⅞	12¼

MATERIAL COSTS REMAIN UNCHANGED



Some Indication Given of Accumulation of Used Cars

Louisville

LOUISVILLE, Ky., Feb. 5—In Louisville the trade is enthusiastic about prospects for big spring business.

January in Louisville has not been an altogether dead month this year. Especially in the first half of the month sales were active. The customary talk of "wait till the show," to be held in February, did not make its appearance until the latter part of the month.

Used car stocks in the hands of dealers have been steadily increasing for the last three months. It has not reached the total of last year, however, but there is nothing at all disturbing in the situation.

Birmingham

BIRMINGHAM, ALA., Feb. 5—Used cars are holding the interest of practically all the dealers in the Birmingham territory. The load that they are carrying in used and repossessed cars is cause for some anxiety.

An outlet for the used cars on hand and those normally to be expected in the next sixty or ninety days is necessary for a healthy condition of the local automotive market. There have been practically no reductions in the number of used cars in the hands of dealers during the last thirty days, but there has been a reduction in the value of these cars through trades.

The outlook for the spring trade in new cars is good if some outlet for the normal trade-ins can be found. Industrial conditions in the immediate Birmingham territory are improving. The farmers of Alabama will go into the spring season with purchasing power about on a par with that of last year.

Cleveland

CLEVELAND, Feb. 5 — Business is very much better than at the corresponding period last year. Sales of new cars have brought in more used cars, it is true, but better used cars are on the market and dealers say that makes it easier to dispose of them.

Records at the office of the county clerk where sales of cars are recorded disclose that there were approximately 800 more transactions recorded in January of this year than in the same month last year.

General business conditions in the city are favorable to immediate good trade in automobiles. Banks report an increase in deposits during January and employment figures show an increase since Dec. 31.

Toledo

TOLEDO, Feb. 5—Although sales of automobiles in this territory were held up considerably by the general spirit of delay to see what the shows would offer, nevertheless dealers had fully as good a month in January as last year, and report a very good start on the new year.

The reaction from the national shows has been very noticeable, and the whole territory is keyed up for the local show, which begins this week.

Dealers expect the next three or four months to shatter all records for sales, due largely to the big interest in new car features, the impetus given by personal contact with prospects at the shows, and the immense amount of publicity that comes with show time. Everywhere an optimistic note is sounded.

Bankers say that credit is plentiful and money cheap. Employment is very near the 1923 peak. January showed an increase in Toledo plants over December, which was a high month. Farmers have more money to spend.

The used car situation has improved here in the last month. Dealers have 200 fewer cars than they had a year ago.

(*Other conditions on page* 316)

MANUFACTURERS ADVANCE SCHEDULES

But Desire to Avoid Overloading Market

Are Building for Dealers Only in Proportion to Early Business of Year

DETROIT, Feb. 5—Production will show a wide increase in February over the first month of the year but will be only a stepping stone to real heavy production which will probably get into action in March. Manufacturers though stepping up production are avoiding any overcrowding of the market and for the most part will build only in quantities that dealers can handle in proportion to the early business of the year.

Dealers now are carrying large stocks in anticipation of the opening of the big spring selling movement and these stocks are being augmented to a considerable extent by stocks which manufacturers are accumulating at strategic distributing points. Retail sales during January and in February are expected to be larger than ever.

The Ford schedule of 10,000 daily still is several months away. January production in the United States will approximate 170,000, and the estimate for February is for about the same total. Including foreign figures, the Ford monthly totals will run in excess of 200,000. It is not expected by factory officials that 10,000 daily will be built before the completion of several building projects now under way.

Bigger Output by Chevrolet

Chevrolet is scheduling approximately 50,000 cars in February, as compared with a January total of about 43,000. The company is working toward an output of 3000 daily in March. Durant will build about 400 cars daily at the Lansing plant, representing Star cars principally, but including some Durant fours. Gray production for the month will approximate 2000 cars.

Heavier increases will be made in medium priced car schedules in February than in the other classes. Buick will operate at close to the 1000 daily schedule, and this figure will be approached by Dodge Brothers, which has worked up to a total in excess of 850 daily. Studebaker schedules call for about 650 daily, with Hudson-Essex approximating 450, and Paige-Jewett at close to the 400 daily mark.

Oldsmobile is now operating at about 325 daily, and Maxwell-Chalmers schedules are for approximately 300 daily. Production on the new Chrysler is stepping up, but it will be another month before it is fully under way. Oakland is operating on a 200 daily schedule, and Hupp operations are at about this same figure. Reo schedules call for about 150 cars and speedwagons daily, and Rickenbacker will approach the 100 daily mark as the month progresses. Dort is building about sixty daily.

In the higher priced lines, Wills Sainte Claire has scheduled about 600 cars for February, an increase from about 200 in January, and it is due to the fact that the company is getting into production on its new models. Cadillac is operating on a schedule of about 100 daily, and Packard is continuing at approximately this figure, the major portion of its production being in its single six models.

Business in Brief

NEW YORK, Feb. 6—Industry seems to have the better of trade in the business battle. Most activity is being displayed in iron, steel, coal, petroleum, whereas in cotton, woolens, silks and footwear there undoubtedly has been a falling off in comparison with the showing of January, 1923. Retail trade has done fairly well through the medium of sales and cold weather.

That barometer of business conditions, car loadings, tells a cheering story, the report for the week ending Jan. 19 totaling 895,276 cars, which is the largest number ever loaded in one week in any January on record. The previous peak was the corresponding week last year, but the new record is 30,979 higher. It also shows an increase of 23,011 over the week preceding that of Jan. 19.

Bank clearings slumped a bit, the reports for the week ending Jan. 31 showing $7,621,592,000, which is a decrease of 2.3 per cent from last week, but a gain of 2.3 per cent over this week last year.

Bank debits totaled $7,451,916,000 in thirty-seven cities, which is a loss of 1.9 per cent from last week.

Crop prices have held up surprisingly well in view of the fact that January usually sees declining prices. The movement of corn has increased, but other grains are below the average.

Cattle, sheep and lambs are holding up well, and prices are higher than they have been for some time. Hog values have eased a bit, while hog receipts at Chicago have been the largest on record for January.

Capacity Operations Rule in Some Plants

Industry Is Proceeding Generally This Month on High Production Programs

NEW YORK, Feb. 4—A large number of the major automobile producers are operating on capacity schedules. Other makers are maintaining high manufacturing schedules, these to be increased gradually so that by the end of February the entire industry will probably be working along the same level as featured the best months of last year.

The industry has swung into February, after an exceptionally good production month, with every promise that the output mark for the same month a year ago will be exceeded by as large a figure as marked the January increase over last year. It is estimated that January output approximated 100,000 more cars and trucks than were built in that month of 1923.

Last year the first quarter showed the smallest aggregate output of the four with a total of 875,503 of which 77,141 were trucks. The best quarter was the second with 1,155,490, of this number 122,879 being trucks. There was a tapering off in the third quarter to 1,000,744 with trucks dropping to 90,130 and a further decline in the last quarter when the output for the three months was 981,319, of which trucks number 86,107.

Year Started at Quicker Pace

The industry has started the present year at a quicker gait with the idea of overcoming the possibility of a shortage of cars in the spring and is either warehousing its surplus product or shipping it to dealers to be stored against spring demand. Some storing of this character was done in December but the movement did not start in earnest until last month. Last year there was a serious shortage during the spring season owing to the fact that few cars were in storage and manufacturers were not able to cope with the current demand.

The sales outlook is distinctly encouraging, business in some sections being reported above normal. The open winter has had a marked effect on sales and has kept demand up to a high point during a generally slow

(*Continued on page* 318)

FIGHT WILL GO ON FOR TAX REPEAL

N. A. C. C. Preparing for Battle in House

Committee's Unfavorable Action Proves No Deterrent to Industry's Efforts

NEW YORK, Feb. 6—Aroused by the failure of the House Ways and Means Committee to include automobiles, trucks and parts in the tentative schedule of those products from which it is recommended that the excise taxes be removed, the National Automobile Chamber of Commerce is preparing for most vigorous action next week when the schedule gets on the floor of the House.

Added to this, the remarks of Senator James Couzens in the Senate, charging that automobile manufacturers would rather have the surtax reduced than the excise tax taken off automobiles have so stirred the industry that the fight will be continued with renewed vigor.

Alfred Reeves, general manager of the National Automobile Chamber of Commerce, has gone to Washington, where he will stay until the battle on the floor of the House is well under way. Representative R. H. Clancy of Michigan, who fathered the three bills recommending the abolition of the automobile taxes, will do the fighting.

The American Automobile Association as representing the car owners in this country, will be the main figure in the battle, led by President Thomas P. Henry. Back of it will be the National Automobile Chamber of Commerce and the National Automobile Dealers Association.

Support Asked of Dealers

The latter has not been inactive the past week, having wired every trade association in the country, calling attention to the failure of the Ways and Means Committee to take action and asking each association to get in touch with its members, who in turn will wire their representatives in Congress, asking for favorable consideration.

Before leaving for Washington, Mr. Reeves pointed out that the Ways and Means Committee either removed or reduced excise taxes on twenty-seven items, representing $103,392,757, which included jewelry, amusements, candy, telegrams, cereal beverages and the like and did not include automobiles, trucks or parts.

Following which he said:

An effort to reduce taxes on all of these items is commendable, but it is highly inequitable to give relief to many items in the schedule and completely ignore the 5 per cent burden on sales of cars and parts, and the 3 per cent levy on trucks, which comes out of the pockets of 15,000,000 motor vehicle users.

Despite the presentations made before the committee by representatives of motor, rubber and accessory manufacturers, car users, taxicab owners and others, the man who has had an accident to his car must continue to pay the Federal Government a tax on his misfortune. The man who operates a truck or car must continue to pay a tax on transportation.

The fact that motor car users frequently pay annually as many as fifteen or sixteen separate and distinct Federal, State and municipal taxes per car is forgotten.

Clancy Charges Partisanship

WASHINGTON, Feb. 4—Following the statement of Representative Green, chairman of the House Ways and Means Committee, that the revenue bill had been considered by his committee on a non-partisan basis, Congressman R. H.

(*Continued on page* 314)

Mechanical Equipment Plays Important Part in Lowering Production Costs in Automotive Industry

AN INTERVIEW WITH JAMES F. MILLER,
President of the James F. Miller & Hurst Corp.

By D. M. McDonald,
Detroit News Representative of The Class Journal Company

Detroit, Feb. 6.

ALTHOUGH the use of conveyors and mechanical equipment for elimination of handling has reached perhaps its greatest perfection in the automotive industry, the end is far from being in sight, declares James F. Miller, president of the James F. Miller & Hurst Corp.

There is no necessity for emphasizing to the industry the importance of conveyor systems in the economic operation of plants, as the history of the industry is to a large extent a recording of the achievements that have been made possible by the use of such equipment. There is need, however, said Mr. Miller, for greater study as to the possibilities of mechanical equipment for the complete development of potential productivity in all plants.

To a considerable extent the mechanical equipment in the industry represents only installations that were made to meet given conditions and do not represent part of a general plan for the complete development of productive resources. Such installations lead to later expense which would not be required if at the time a general study of the plant had been made and the equipment designed to fit in with subsequent development.

Conveyors and mechanical equipment should always be considered with a view to the ultimate development of every plant. Then installations can be made as required, without interruption to production schedules which is an important consideration in most plants, and when completed every unit and operation in the plant will be in conformity.

As an indication of the possibilities for development of mechanical handling of material and parts, Mr. Miller cited the fact that probably every new plant or addition that is erected by the Ford Motor Co. shows an adaptation of conveyor operation looking toward increased efficiency, and this despite the fact that in practically every instance each new plant embodies the latest ideas in mechanical equipment.

To Henry Ford, Mr. Miller credited the conception of automobile manufacture by use of mechanical systems which have made it possible to build cars within the price reach of every one. Until the Ford Motor Co. placed its manufacture on a mechanical basis there had been little use of conveyerage in plant operation, the chemical industry having made the greatest progress. Today the use of conveyors has made the automotive industry the subject of study by every other industry.

That the automobile dollar will now purchase a greater value than it has ever done before is the result of efficiency in operation. Not only have manufacturing costs been brought lower than they have ever been before, but far larger production and expansion of operations have been made possible without factory additions that otherwise would have been necessary. The United States has been placed in a position where it can compete with the products of any country despite much higher wage scales.

Increased use of mechanical equipment in all industries will solve labor shortages, said Mr. Miller, and make it possible not only to increase wage schedules but relieve labor of its most trying physical tasks. Without any increase in the available labor, he said, the factories of the United States can proceed to make large increases in their capacity by applying scintific methods in their operation.

Parish Shareholders to Get Midland Stock

Will Receive 30,000 8 Per Cent Participating Preferred for Their Common

CLEVELAND, Feb. 6—The holders of 150,000 shares of no par common stock of the Parish & Bingham Corp. are to receive 30,000 shares of 8 per cent participating preferred stock of the Midland Steel Products Co.

The Parish & Bingham Corp. has 35,000 shares of 8 per cent participating preferred stock in its treasury which it received for its assets at the time of the merger of the Parish & Bingham and Detroit Pressed Steel into the Midland Steel Products Co.

Since 30,000 shares of the stock are to be distributed it will be on the basis of one share of the participating preferred, $100 par value, for each five shares of Parish & Bingham no par common, which is now quoted at $15 a share, making the par value of the five shares around $75.

Each holder of Parish & Bingham also will receive a participating certificate representing the balance of any stock held in the treasury or of cash so held by Parish & Bingham, the balance to be distributed when the affairs of Parish & Bingham are adjusted. Transferable warrants will be issued representing fractional shares.

During the past year Midland Steel Products Co. sold 1,842,468 automobile frames and did a business in excess of $15,000,000. The frame business showed a 43 per cent increase in 1923 over what the consolidated companies did in 1922. Increase in sales amounted to 50 per cent. Capital of Midland Steel consists of 50,000 shares of no par common; $7,000,000 of 8 per cent participating preferred and $2,500,000 of 7 per cent first mortgage bonds.

Perfection Tire Factory Brings $275,000 at Sale

FORT MADISON, IOWA, Feb. 2—The $5,000,000 Perfection Tire & Rubber Co. holdings, including machinery and other equipment, real estate and houses, were sold to Charles W. Mills, Wilmington, Del., for $275,000 at a receiver's auction sale. The sale is contingent upon the court's approval, which is expected to be given.

Preston E. Roberts, former president and general manager of the plant, bought the patents, copyrights, good will, etc., for $500 and Albert Kahn of the Consolidated Products Co., Chicago, purchased surplus supplies, consisting of raw materials, electrical equipment, etc., for $7,600.

Mr. Mills denied that he was acting as an agent for the Nemours Trading Corp. He said that while he had no definite plans until the court had given approval to the transaction, he was "determined to sell or lease the plant to responsible parties who will conduct it as a tire manufacturing plant and will not consider splitting it up and offering it for sale."

More than 100 persons attended the sale. Attempts to dispose of various parcels by the Gerth Realty Experts did not prove satisfactory. There were only two bidders for the plant as a whole; the Consolidated Products Co. offered $225,000 for the holdings.

National Motors Resists Action to Sell Property

CINCINNATI, Feb. 6—United States District Court Judge Hickenlooper has heard the arguments of counsel on an application of Louis Ruthenberg, East Moline, Ill., former president of the National Motors Corp., Dayton, Ohio, for an order directing the sale of personal property of the corporation attached by him in his suit in the Federal court at Dayton for recovery of $27,500 as salary.

The application was resisted by counsel representing the Union Trust Co. of Chicago, et al., as trustees under a mortgage or trust deed given by the corporation to secure $6,000,000 of bonds issued by the corporation approximately two years ago and upon which, the trustees allege in a recent suit for foreclosure and the appointment of receivers, the corporation defaulted interest due in July, 1923, and January, 1924.

To Operate Kentucky Plant

LEXINGTON, KY., Feb. 6—Judge Charles H. Moorman has appointed Richard V. Board receiver for the National Motors Corp.'s holdings in Kentucky, consisting of the Kentucky Wagon Manufacturing Co. of which Mr. Board is president. Mr. Board gave bond of $10,000. The plant will continue to operate under his supervision.

Receiver in Indianapolis

INDIANAPOLIS, Feb. 5—Thaddeus Baker of this city has been appointed ancillary receiver for the Indianapolis plant of the National Motors Corp. by Judge A. B. Anderson of the United States District Court. The appointment of Mr. Baker follows receivership proceedings begun several weeks ago at Cincinnati.

Appointed in Boston

BOSTON, Feb. 4—Harris H. Gilman of Cambridge has been appointed ancillary receiver by Federal Judge Anderson for the property owned in this State by the National Motors Corp.

ELECTRIC SERVICE OFFICERS

CHICAGO, Feb. 6—The new officers of the Automotive Electric Service Association elected at the convention held during show week are: President, P. J. Durham, New York; vice-president, E. S. Cowie, Kansas City; treasurer, F. W. Duffeck, Toledo, and secretary, Harry Hernen, Trenton, N. J.

G. M. Acceptance Adds to Its Capital Funds

Makes Way for Big Year by Selling 16,000 Shares to General Motors Corp.

NEW YORK, Feb. 4—An additional $2,000,000 of capital funds has been secured by the General Motors Acceptance Corp. through the sale to the General Motors Corp. of 16,000 shares of its capital stock at $125 a share. This financing was made in order to accommodate comfortably expected business and in consideration of the volume of current business.

This gives the corporation a full-paid capital stock of $7,600,000, with surplus and undivided profits of approximately $3,000,000, with all of the stock owned by General Motors.

In 1923 the Acceptance corporation handled a volume of $197,000,000 of business in its domestic, Canadian and London classifications and close to $21,000,000 of foreign business, a total volume of $218,000,000. This compares with a total of $135,000,000 in 1922.

Domestic, Canadian and London receivables outstanding on Dec. 31, 1923, stood at $67,319,443 and foreign bills of exchange at $7,051,488. The deferred income account or charges receivable in advance stood at $2,361,873 and reserves at $1,303,079. Of total domestic, Canadian and London receivables outstanding Dec. 31, the corporation reports only $50,000, sixty-days or more past due.

Comparative Balance Sheet

The comparative balance sheet of the corporation as of Dec. 31 follows:

ASSETS

	1923	1922
Cash in Banks and on Hand	$6,729,780	$4,429,846
Cash in Trust	2,951,416	1,462,685
Notes Receivable	67,319,443	44,782,958
Foreign Bills of Exchange	7,051,488	2,685,776
Due from Banks on Discounts	809,650	87,962
Accounts Receivable	223,434	334,980
Interest Earned Not Rec'd	5,335	2,293
Furniture & Equipment (Less Deprec.)	331,360	319,375
Investments	6,000	6,000
Cash & Securities Pledged by Foreign Customers (Contra).	80,506	192,282
Prepaid Discount	579,398	326,223
Deferred Charges	25,370	15,412

LIABILITIES

	1923	1922
Capital Stock	$6,000,000	$4,800,000
Surplus & Undivided Profits	2,545,045	1,509,256
Notes Payable	65,116,687	43,517,619
Foreign Bills Discounted	6,896,183	2,442,154
Accounts Payable	1,809,811	193,542
Cash & Securities Pledged by Foreign Customers (Contra).	80,506	192,282
Interest & Charges Received in Advance	2,361,872	1,117,984
Reserves	1,303,079	872,958

Buda Manufacturing New Engine for Bus

Has Six Cylinders and Will Be Ready for Delivery About First of March

HARVEY, ILL., Feb. 4—A six-cylinder bus engine on which the Buda Co. will give deliveries about March 1 was on exhibition at the Congress Hotel during Chicago show week. It is a 4 x 5⅛ in. block cast unit, designed for unit power-plant construction and three-point mounting.

It has a four-bearing crankshaft of 2½ in. diameter. All of the main bearings are of the same diameter and two of them are of the same dimensions as the crankpin bearings thus reducing the number of bearings to service to three.

The block, cylinder head and crankcase are all separate castings. The case is cast aluminum and the bottom pan, which was of aluminum on the engine shown at the Congress, will be pressed steel in production. A No. 3 S. A. E. bell housing can be fitted. The inlet valves have a clear diameter of 1⅞ in. and the exhausts of 1¾ in.

The valve lift is ⅜ in. and the stem diameter 7/16. The tappets are of the mushroom type. Lubrication is by pressure. Provisions are made for both battery and magneto ignition. The starter, generator and carbureter are on the right side of the engine and the waterpump, distributor and fan pulley on the left.

The front end drive comprises four helical gears of 1¼ in. face. A departure from previous Buda practice is that the crankcase is split below the centerline of the main bearings.

Selden Plans to Market New Truck About March 1

ROCHESTER, Feb. 4.—Specifications are being completed by engineers of the Selden Truck Corp. here for a new light speed truck to be called the Selden Pacemaker, which the corporation plans to put on the market about March 1.

The truck will have a capacity of 1¼ tons and will sell for about $1,500, it is understood. It will be snappy in appearance with streamline cowl, crown fenders and pneumatic tires on all four wheels. The engine will be four-cylinder, with 4 in. bore and 5 in. stroke. A six-cylinder engine will be optional at increased price.

The truck is designed for fast light delivery, having bevel gear drive, electric starter and lights and maximum speed of 45 m.p.h. It has a wheel base of 144 in. with 9 ft. loading space behind driver's seat.

STUDEBAKER SALES IN 1923

DETROIT, Feb. 5—Studebaker Corp. of America reports that sales last year were more than 145,162 cars, which made it the greatest year in the company's history. In 1922 total production and sales amounted to 110,269, and in 1923 production totaled 150,118.

PERMANENT EXHIBIT LOSES; SHOWS WIN

CHICAGO, Feb. 2 — National shows at New York and Chicago will not be abandoned, nor will there be a permanent exhibit of automotive products at Detroit, if the action of the directors of the National Automobile Chamber of Commerce has any weight with the members.

The question came up before the meeting of the board this week, but it did not make much headway. Those favoring such a radical step believed the industry would be better served by having a permanent exhibit at Detroit, possibly at the Fair Grounds, where dealers could come and look over the new models, thus obviating the necessity of holding national shows.

This, however, did not meet with the approval of the directors, and the plan was promptly squelched, Show Manager S. A. Miles being told to go ahead with his plans for the 1925 exhibitions.

It may be that the show dates next year will be a week later. It has been proposed that the New York show open Jan. 10 instead of Jan. 3. A decision in this will be reached at the March meeting of the board.

Show Managers Re-elect Association Officers

CHICAGO, Feb. 4.—The National Association of Automobile Show and Association Managers held its annual meeting during the Chicago show and re-elected officers as follows: President, Robert E. Lee, manager, St. Louis Automobile Dealers Association; vice-president, Herbert Buckman, manager, Cleveland Automobile Manufacturers and Dealers Association; secretary treasurer, Neal G. Adair, editor, *Motor World.*

The officers make up the Board of Directors, with Price Wells, president of the Louisville Automobile Dealers Association, and H. H. Shuart, manager of the Detroit Automobile Dealers Association.

Most of the members of the national association attended the meeting. Those whose shows had been held reported increased attendance and buying as compared with last year.

Tentative plans were made for the usual two-day show management and association management convention in August, this year, at Atlantic City.

S. A. Miles, show manager of the National Automobile Chamber of Commerce, was a guest at the meeting and at the luncheon which preceded it.

Yellow Gets License for Weymann Bodies

It Is Also Announced That Fleet of Paris Taxicabs Will Make Use of Them

PARIS, Jan. 28 (*by mail*)—The Yellow Cab Manufacturing Co. of Chicago has secured a license for the construction of Weymann type wood and canvas bodies in the United States, declare the directors of the French Weymann Body Building Co. of Paris.

Weymann bodies are to be used for a new fleet of Paris taxicabs, the sample model of which came out this week. A 10-hp. Peugeot four-cylinder chassis, with four-speed gearbox is being made use of, balloon tires will be fitted and the normal accommodation will be two passengers with two emergency seats. Lucien Rosengart, a stockholder in the Peugeot company, is backing the new venture.

Rosengart soon after the Armistice put into service a fleet of 600 Citroen narrow track taxicabs and a number of baggage-carrying cabs. The passenger vehicles have met with considerable success, but owing to the large amount of dead mileage the baggage taxis were a failure. It is understood that Rosengart's intentions are to withdraw his Citroen taxicabs and replace them by Peugeots with the Weymann body.

Chandlee Patent Action Announced as Settled

NEW YORK, Feb. 4—Announcement has been made by the interested parties that the litigation between the No-Leak-O Piston Ring Co. of Muskegon, Mich., and the McQuay-Norris Manufacturing Co. of St. Louis, over the title to the Chandlee patent for grooved piston rings, has been settled by agreement, which adjusts all claims between the two companies relating to the patent.

The agreement gives each of the concerns an equal interest in the patent, with the right for either to sue infringers for an injunction and an accounting for profits and damages.

Receivership Petitioned for Steinmetz Electric

BALTIMORE, Feb. 4—Appointment of receivers for the Steinmetz Electric Motor Car Corp., with a plant at Arlington, Md., is asked for in a petition filed in the Circuit Court by William H. Holmes, a tractor salesman, with a claim of $296 for salary and expenses. The company has until Feb. 11 to show cause why the appointment should not be made.

It is claimed that unsatisfactory relations with the Steinmetz Syndicate of Massachusetts are partly to blame for the troubles of the company, which was organized in Maryland Dec. 24, 1919.

12 New Balloon Tire Sizes Are Approved

Action of Rubber Association Division Brings Number to Twenty-three

NEW YORK, Feb. 6—No fewer than a dozen new balloon tire sizes were approved by the Tire Manufacturers Division of the Rubber Association of America at its monthly meeting here today. Five sizes for 20 in. rims, four sizes for 22 in. rims, one for 23 in. and two for 25 in. were added to the eleven sizes formerly approved, so that there are now a total of twenty-three sizes, including those for existing standard rims. A complete list of approved sizes is given in the appended table.

BALLOON TIRE SIZES

Rim Diameter	Nominal Diameter in. of tire	Section Diameter	Nominal Rim width
*20	28	4.40	3½
*20	29	4.95	4
*20	30	5.25	4
*20	30	5.77	4½
*20	31	5.77	4½
20	32	6.20	4½
20	34	7.30	5
21	29	4.40	3½
21	31	5.25	4
21	33	6.20	4½
21	33	6.60	5
*22	34	4.40	3½
*22	31	4.95	4
*22	32	5.25	4
*22	32	5.77	4½
23	31	4.40	3½
23	32	4.95	3½ or 4
23	33	5.77	4½
*23	35	6.60	5
24	33	4.95	4
24	34	5.77	4½
*25	34	4.95	4
*25	35	5.77	4½

*New Sizes.

Approval of the proposed table of inflation pressures published in AUTOMOTIVE INDUSTRIES about a month ago was not forthcoming, and the matter was referred back to the Tire & Rim Association whence it originated.

It is understood that at least a part of the new balloon sizes were added at the behest of large passenger car manufacturers. Buick is mentioned as having insisted upon a tire for 22 in. rim diameter.

Although the present situation had been discounted to some extent in advance of the meeting, it was not generally expected that so formidable a list of sizes would receive approval. But few if any concerns are expected to manufacture all of the new sizes, and there is believed to be a general disposition to keep the list of each maker as small as possible.

There appears to be considerable interest in President W. O. Rutherford's plans for effecting economies estimated at $30,000,000 a year—so much interest, in fact, that today's meeting was adjourned until tomorrow chiefly to hear further details of this plan.

On the other hand it is freely predicted that much of this saving, if it is realized, will be eaten up in the increased cost of equipment for manufacturing the numerous new sizes of balloon tires and in the extra stocks and merchandising costs involved in putting through the balloon tire program.

It was generally agreed that the table of inflation pressures, suggested by Goodyear to the Tire & Rim Association and referred by that organization to the Rubber Association, provided for pressures much too high for most balloon tires. Consequently the table was referred back to the Tire & Rim Association. Pending further action by that body, it was agreed that dealers be advised to recommend to customers inflation pressures of 20 to 30 lb., depending upon load.

Matters pertaining to tire guarantees were also considered.

New Goodyear Balloon Tire

AKRON, OHIO, Feb. 5—Goodyear Tire and Rubber Co. has announced a new balloon tire which can be used on present rims. The new casing is made in five sizes. It will replace 30 x 3½ clincher cord, fabric and straight side; 31 x 4; 32 x 4; 32 x 4½, and 33 x 4½.

The company states in its announcement that no expense is connected with switching to these tires on cars equipped with straight side rims. In the case of clinchers only the expense of changing from clincher to straight side rims is added.

Firestone Price Cut

AKRON, Feb. 6—The 15 to 20 per cent reduction made in the prices of balloon tires by the Firestone Tire & Rubber Co. brings the prices, according to President Harvey S. Firestone, to a stable basis from the artificial and experimental high figures at which the casings were placed on the market.

When the casings were first announced they were priced sufficiently high to offer a safe margin for future reductions. The reduction does not affect any other Firestone prices.

Goodyear's Sales in 1923 Reached $106,026,109

AKRON, Feb. 6—President G. M. Stadleman announces that Goodyear Tire & Rubber Co. sales for the year ended Dec. 31, 1923 amounted to $106,026,109 as compared with $102,904,177 in the preceding year. Net earnings before charges were $12,720,127; net to surplus, $6.507,245, and net before charges, $10,938,747. Current assets are reported at $56.584,789 and current liabilities at $7,612,707, a ratio of 7.4 to 1.

Inventory amounted to $28,355,175 as compared with $30,585,736 at the end of 1922; cash, $13,204,649 as contrasted to $10,334,180, and the funded debt, $51,250,000 in comparison with $55,250,000.

Goodyear and its subsidiaries did a total business of $127.880.082 in 1923 as compared with $120,450,800 in 1922.

Automotive Division Chief Is Percy Owen

Former President of Liberty and Saxon Becomes Head of Government Bureau

WASHINGTON, Feb. 6—Percy Owen, formerly president and general manager of the Liberty Motor Car Co., has been appointed chief of the Automotive Division of the Bureau of Foreign and Domestic Commerce. Mr. Owen fills the place vacated over a year ago by Gordon Lee, now general manager of the Fageol Motors Co. of Ohio. M. H. Hoepli has been acting chief of the division during the period since Mr. Lee's resignation.

The work of the Automotive Division, as measured by commercial inquiries answered and survey work completed, has quadrupled in the last twelve months and its personnel has doubled. The development of the extensive merchandising service and of the automotive foreign trade manual have been the outstanding achievements of the division during the past year.

To the further extension of these activities, Mr. Owen brings a wide experience in foreign as well as domestic selling. When associated with the Chalmers Motor Car Co. a few years ago, he introduced personally the Chalmers car in Europe and has investigated and appointed dealers in nearly every automobile-using country in the world.

First with Winton Co.

He began his automotive career in 1899 when he joined the Winton Motor Car Co., with which organization he remained until 1906. From 1906 to 1908 he was engaged in importing Bianchi cars from Italy to the United States. In the latter year he became a dealer for Chalmers cars and shortly afterward joined the Chalmers factory organization, in which he held various responsible positions, being sales manager from 1912 to 1915.

After leaving the Chalmers company, Mr. Owen was elected president of the Saxon Motor Car Co. and later of the Liberty company. He has resigned as vice-president and general manager of the Mailometer Co., to accept the Washington post.

Rest of Earl Inventory to Be Sold February 12

DETROIT, Feb. 5—Following the liquidation of a large part of the inventory of Earl Motors in finished automobiles which have been sold in several cities of the country, the remainder of the inventory is being advertised for sale at public auction in Jackson on Feb. 12 at 10.30 a.m.

The stock comprises general accessories, paints and oils, trimming and body materials, bodies and small parts. A large stock of tools will also be included in the sale.

Men of the Industry and What They Are Doing

Curtin Succeeds Williams

E. A. Williams, Jr., has resigned as president and general manager of the Garford Motor Truck Co. of Lima, Ohio, and E. R. Curtin, Sr., of Lima, a director for a number of years, has been elected to fill the vacancy. John E. Galvin, president of the Ohio Steel Foundry Co., has been named chairman of the executive committee of the board of directors.

Changes with Wolseley Motors

Arthur McCormack, for a great many years managing director of Wolseley Motors, Ltd., Birmingham, England, has resigned his connection with that company. No new appointment is to be made to take his place, but B. Caillard, chairman of the board, and A. Jacob, another director, will act as managers. F. W. Lanchester, brother of George Lanchester of the Lanchester Motor Co., has been appointed consulting engineer, to collaborate with E. Reeve, recently Mr. McCormack's deputy and now to be technical manager. Mr. Lanchester has accepted this appointment in addition to that of consulting engineer to the Coventry Daimler and other companies.

Kalman Made Board Chairman

Paul J. Kalman of St. Paul, who has been president of the Globe Steel Tubes Co. of Milwaukee, has been elected chairman of the board. He is succeeded as president by Frank J. O'Brien, who has been vice-president and general manager. John W. Floto of Chicago, who has been general manager of sales, has been named as vice-president.

Grubb Now in Charge of Sales

Harry A. Grubb has been elected vice-president in charge of sales of the Victor Rubber Co. of Springfield, Ohio. Mr. Grubb started in 1913 selling Firestone tires, later becoming manager of the Oldfield Tire Co., a Firestone subsidiary. In 1922 he resigned this connection to take over the sales management of a smaller tire company.

Ford Promotes W. W. Mitchell

W. W. Mitchell, formerly manager of the Ford Motor Co. branch at Atlanta, has been appointed in charge of advertising at the home offices in the Highland Park plant. The appointment of an advertising manager is in connection with the company's advertising campaign which is being conducted through the Brotherton company.

Fairey Studying Aviation Here

C. R. Fairey, chairman of the Society of British Aircraft Construction and chairman of the Fairey Aviation Co., is in the United States, making a first-hand study of the progress this country is making in commercial aviation. Mr. Fairey is particularly impressed with the aerial mail service the United States Government has developed.

Welling Represents Graver

L. H. Welling has been appointed manager of the eastern office of the Graver Corp. of East Chicago, Ind., maker of tanks, water softeners, filters and general steel construction work. Mr. Welling's headquarters are in the Grand Central Terminal Building, New York City.

H. L. Dunn Resigns

H. L. Dunn has resigned as general purchasing agent of the National Motors Corp. During the last few months he has made his headquarters at the Jackson, Mich., plant.

Office Opened by Clifton Reeves

Clifton Reeves, who has been industrial engineer for the Willys-Overland Co. for five years, has resigned and will open New York and Detroit offices. Mr. Reeves had charge of welfare employment and economy work in the Toledo plant.

Crowther Here on Rubber Mission

G. Raymond Crowther, representing the Rubber Growers' Association of England, is visiting the United States for the purpose of developing new markets for rubber and to investigate conditions in the rubber trade.

Lazarnick Takes Trip Abroad

Nathan Lazarnick, photographer of motoring events since the birth of the industry, is taking a well earned vacation. With Mrs. Lazarnick, he sailed on Wednesday on the Rotterdam on a five weeks' cruise through the Mediterranean.

Williams Joins Apco

Robert Williams, for nearly six years sales manager of the Pennsylvania Rubber & Supply Co. of Cleveland, has joined the Apco Manufacturing Co. of Providence, R. I., in the same capacity.

Wisenburgh with U. S. Ball Bearing

Clyde Wisenburgh, formerly sales representative of the Standard Bearings & Equipment Co. of Plainfield, N. Y., has joined the sales force of the U. S. Ball Bearing Manufacturing Co. of Chicago, maker of Strom ball bearings.

Sperry Manages Philadelphia Bronze

R. O. Sperry has been appointed general manager of the Philadelphia Bronze Bearing & Tube Co., which controls the Small patented process of manufacturing composite and butt joint bushings and also markets the conventional cast bronze bearing products.

Wilson Is Nash Director

James T. Wilson has been elected a member of the board of directors of the Nash Motors Co. Mr. Wilson has been identified with President C. W. Nash for the last eighteen years and was made a vice-president of the company three years ago, in charge of production at both the Nash plants. Last October he was placed in direct charge of operations at the Nash Four plant, and since then he has divided his time equally between the Kenosha and Milwaukee factories.

F. Earl Winchester Resigns

F. Earl Winchester, for the last fifteen years engineer and superintendent of the George W. Davis Motor Car Co. of Richmond, Ind., has resigned and will locate in Indianapolis after a good vacation. Before leaving Richmond Mr. Winchester was given a dinner by the Davis foremen, at which he was presented with a diamond pin by the Davis employees.

Graham to Speak on Safety

George M. Graham, chairman of the Traffic Planning and Safety Committee of the National Automobile Chamber of Commerce, will address the tenth annual conference on highway engineering of the University of Michigan at Ann Arbor, Thursday, Feb. 14, on "Education, Punishment and Traffic Safety."

Industrial Preparedness Against War Discussed

NEW YORK, Feb. 5—Industrial preparedness against war was the subject discussed at a dinner attended by some 800 engineers and executives here this evening. Judge Elbert H. Gary, chairman of the board of the United States Steel Corp., presided.

The principal address was made by Hon. Dwight F. Davis, Assistant Secretary of War, who spoke on the need for industrial cooperation in plans looking toward an adequate supply of munitions in case this country should be drawn into a war for defense of the Nation.

Many men prominent in automotive circles in this vicinity were present.

Stout Metal Airplane Holds Annual Meeting

DETROIT, Feb. 6—Directors of the Stout Metal Airplane Co. were elected at the annual meeting held here. They are Sidney D. Waldon, chairman; R. A. Stranahan, George Holley, Edsel Ford, Charles P. Bohn, A. T. Waterfall, William B. Mayo, Harold H. Emmons, Fred Warner, W. O. Briggs, Charles T. Bush, Fred Fisher, C. F. Kettering, Harry R. Graham and William B. Stout.

The meeting was held at the Aviation Town Club.

Industry Maintains Quick Pace of 1923

M. A. M. A. Directors Get Reports of Particularly Good Conditions at Present

CHICAGO, Feb. 4.—Directors of the Motor and Accessory Manufacturers Association, meeting here, received reports which indicate that business in the automotive industry at the present time is particularly good, with a large volume of orders assured for the first half of 1924. Summing up the situation, it was noted that on the whole, the industry is strongly maintaining the rapid pace of last year.

"The volume of orders in hand indicates a stronger condition than a year ago this time," President G. Brewer Griffin said following the meeting. "Sales are always stimulated by the annual automobile shows in New York and Chicago, but this month there is more rapid buying than during last January.

"There is marked evidence of caution and conservatism, however. Orders are being placed for closer delivery, with a tendency to avoid contracts for long commitments until after the political situation has become settled, which practice may result in a condition not entirely satisfactory to either buyer or seller."

Continuing, Mr. Griffin said:

There seems to be no practical difference of opinion that the first six months will yield a satisfactory volume of business, but there is less than the usual inclination to estimate longer than that period, although there seems now no reason to believe that the expected rate of production will not materialize.

There is a gradually growing belief that the parts industry is facing rapid changes due to the tendency toward consolidations and the elimination of weaker manufacturers through the force of increasingly keen competition in manufacture and distribution.

Employment in Detroit, the automotive center, is higher than normally. Steel is not being bought far ahead, but buying for current requirements is large. Demand for tires by leading car producers is good and will be better as balloon tires become more generally available.

There has been more than a normal reconditioning of cars this month, both by dealers and owners, which has stimulated the demand for repair parts.

Heminway Addresses Association

CHICAGO, Feb. 2—Members and guests of the Automotive Manufacturers' Association at a dinner last night heard M. L. Heminway, general manager of the Motor and Accessory Manufacturers' Association, discuss business conditions, mergers, excise taxes and simplification.

Following Mr. Heminway's address the association unanimously adopted a resolution petitioning Congress to repeal the excise tax on automotive replacement parts. This resolution previously had been drafted by the association's tax committee.

Mr. Heminway stated that automobile manufacturers are not placing long-time commitments with the parts makers. Indications, he said, were that they are providing for their needs for the first six months of the year and awaiting further developments before determining the course to follow in the last half.

Speaking of opportunities for the accessory manufacturer, he declared there is an ever increasing market for replacements and repairs. He suggested diversification of products as a measure to assure continued profitable operation. He told of one rubber manufacturer who recently developed a rubber molding and beading for the interior of closed cars.

White Sales Last Year Exceeded $48,000,000

CLEVELAND, Feb. 6—Gross sales of the White Motor Co. for 1923 totaled more than $48,000,000, according to the preliminary figures of the company. Net earnings, after all charges except dividends, approximate $6,900,000, making the surplus as of Dec. 31, 1923, about $9,400,000. The company's dividend payments, uninterrupted since its organization, have been continued on the basis of 8 per cent annually.

Preliminary figures indicate that the final balance sheet will be about as follows:

Assets—Capital assets less depreciation, $8,453,000; good will, $5,388,000; current assets, $26,919,000; other assets, $321,000; total, $41,081,000.

Liabilities—Capital stock, 500,000 shares at $50 par, $25,000,000; purchase money obligation, $309,000; current liabilities, $4,522,000; Federal tax estimates, $850,000; reserve for contingencies, $1,000,000; surplus, $9,400,000; total, $41,081,000.

Paige-Detroit Reports Closed Cars Sell Best

DETROIT, Feb. 5—A comparison of Paige-Jewett January sales for 1924 and 1923 as between open and closed car business shows an almost complete reversal in the two years. Open car business a year ago ran 62 per cent of the total and this year closed car business leads with 58 per cent. The introduction of the Jewett brougham at a price much lower than former closed car models in the line is accredited with bringing closed car business to present high points.

Demand for closed cars, the company reports, shows gains in all parts of the country with the New York district the largest contributor. The Middle Western and New England territories shows large increases in closed car demand with smaller gains reported from the south and west. The Pacific Coast region continues to take open cars in large quantities, preferring removable enclosures to the permanent type.

Production in all models in January approximated 5500 cars and will be increased in February by about 1000 as the company gets its new Jewett plant into more complete operation. Production is reported divided approximately two-thirds Jewett cars and one-third Paige.

Du Pont de Nemours Shows G.M. Holdings

Annual Report of Company States $8,346,000 Was Received in Dividends

WILMINGTON, DEL., Feb. 4.—The annual report of the E. I du Pont de Nemours & Co., for 1923 shows that during the year the company received $8,346,000 from dividends paid by the General Motors Corp. on its common stock, in addition to which it received $9,926,086 from the Managers Securities Co. for a 30 per cent interest in the General Motors Securities Co., on the basis of $15 a share.

This was the stock secured to bring about the plan to take General Motors executives into partnership. Since that sale du Pont now holds approximately five and one-half shares of General Motors stock for each share of du Pont common.

Continuing, the report says:

Preliminary estimates of the General Motors Corp. indicates that the earnings on its common stock, plus its accrued earnings in the Fisher Body Corp. will be approximately $3 per share for the year 1923, so that there has accrued to the interest of your company, on its holdings, reduced as described above, in addition to the amount included in the summary of consolidated income and profit and loss, approximately $9,480,000, making total earnings received and accrued on your General Motors Corp. common stock of $17,826,800.

Gets Portion of Other Earnings

The annual report also shows that the du Pont company's portion of net earnings of owned or controlled companies, after deducting all charges, including bond interest, was $17,346,221, which after payment of dividends on debenture stock amounts to 13.93 per cent earned for the year on the common shares. These earnings compare with $9,445,751 in 1922.

The balance sheet shows current assets of $72,258,095 and current liabilities of $8,809,279, resulting in net current assets of $63,448,816, and a ratio of current assets to current liabilities of more than 8 to 1. These figures compare with a net current asset position for Dec. 31, 1922, of $53,767,924 and a ratio of less than 7 to 1.

Suit Involving Harris Patent Is Terminated

NEW YORK, Feb. 6—The United District Court of the District of New Jersey has enjoined the E. A. Whitehouse Manufacturing Co. and the Automotive Equipment Co. from making or selling combined pet cock wrenches and cleaning tools similar to those manufactured by the J. H. Faw Co. under the Harris patent, the validity of which is upheld by the court.

The case was settled out of court, the defendants paying the costs of the suit.

Scotland Shows Bent Toward Closed Cars

Thirty-five Per Cent of Models Exhibited at Glasgow Are of This Type

GLASGOW, Jan. 29 (*by mail*)—The annual Scottish show brings to light no new models by well known makers, with the exception of a 14-30-hp. Belsize six-cylinder car. It indicates, however, that Scottish dealers, who form the vast majority of its exhibitors, anticipate an increased demand for closed cars of the sedan, landaulet, limousine and similar types. These form 35 per cent of the passenger car exhibits.

Kelvin Hall, where the show is being held, is much smaller than Olympia, and low-pitched, but it provides space for approximately 400 passenger, 50 trucks and 250 motorcycles. In addition there are seventy-six accessory booths.

As with Olympia, the show is international in character. American makers are well represented. In the passenger car section there are Buick, Chandler, Chevrolet, Cleveland, Dodge Brothers, Durant, Essex (four-cylinder model), Hupmobile, Oakland, Overland, Studebaker and Willys Knight; on the truck side, Buick, Chevrolet, Dodge Brothers, G. M C., Graham and Overland, and motorcycles by Harley-Davidson and Indian.

Front-wheel brakes are the outstanding engineering development, and the increased braking efficiency thus represented makes an even more forcible appeal than in England, owing to the mountainous nature of such a large portion of Scotland and the precipitous and lengthy gradients with winding roads and hairpin corners that abound. Hills with gradients of 15 to 20 per cent are found even in some of the cities and towns.

It is to be noted, however, that the front brakes promised at Olympia by Rolls-Royce have not made their appearance on the cars of this make at Glasgow. Buyers are told that the present price of the 40-50-hp. model includes front brakes and that these will be fitted later on to the cars delivered meanwhile.

Charcoal Used for Gas in New Berliet Model

PARIS, Jan. 29 (*by mail*)—Berliet has produced a gas producer plant applied to its 15-h.p. passenger car chassis, having a four-cylinder engine of 3.5 and 5.1 in. bore and stroke, and using charcoal as fuel.

The gas producer, which is the invention of Engineer Imbert, differs from others of the same general type by reason of its small dimensions, which allow it to be carried at the rear of a passenger car chassis. The external dimensions of the plant are 23 x 23 x 39 in.

The gas leaves the producer at the very high temperature of 1400 degrees Cent., and is reduced to 60 or 70 degrees before entering a scrubber composed of metal cuttings soaked in oil. The standard Berliet engine has undergone no other change than in increase in compression.

With gas produced from charcoal the power loss is about 25 per cent, but it is believed that a portion of this loss can be recovered. The economy in fuel costs is 80 per cent, and while there is a loss in speed, pick-up is declared to be as satisfactory as with gasoline. An official ceremony, attended by the military and local civil authorities, marked the appearance of this new vehicle.

30,400 Cars Were Sold in Argentina Last Year

WASHINGTON, Feb. 6.—A total of 30,400 new motor vehicles were required to fill the 1923 demands in Argentina. This record, which greatly exceeds all previous trade anticipations, was given to the Bureau of Foreign and Domestic Commerce in a cable message received from its representatives in Buenos Aires.

The previous best year in the automotive industry in Argentina was 1920, when slightly more than 27,000 vehicles were imported. The figures for 1923 include importations and assemblies made in Buenos Aires. The cablegram reported also that "sales continued good" into the new year and the outlook here is believed to be excellent for continuation of the present high demand.

British Car Builder Enters Truck Field

LONDON (*by mail*), Jan. 30.—A one-ton truck has just been announced by Morris Motors, Ltd., the largest producer of passenger cars in England.

The power plant of the new vehicle is similar to that of the passenger car, being a four-cylinder engine with bore and stroke of approximately 3 x 4 in. The lubrication system is unusual in that the spring loaded plunger pump, of which the suction port is submerged, delivers the oil to the three main bearings of the crankshaft, the overflow from the latter being depended upon to maintain the level in the troughs under the big ends.

The new truck will be built at a factory recently purchased by Morris from E. G. Wrigley & Co., Birmingham.

Isotta-Fraschini to Have French Assembling Plant

PARIS, Jan. 29 (*by mail*)—Italian Isotta-Fraschini cars are to be assembled in France, a company for this purpose having been formed with a capital of 500,000 francs, having at its head Lucien Rosengart, one of the leading stockholders in the Peugeot Co., who until recently was associated with Citroen.

A net profit of 3,135,021 francs is shown by the Chenard Walcker Automobile Co. of Paris for the year 1923, this being an increase of 653,570 francs on the previous year's working.

French Run Tractor with Charcoal Fuel

Exhibition of Agricultural Machinery Shows Plants for Producing Gas

PARIS, Jan. 28 (*by mail*)—Agricultural tractors running on charcoal gas constitute the automotive feature of the agricultural machinery exhibition now being held in the Grand Palais.

Renault is exhibiting his creeper track agricultural tractor, developed on war tank experience, with a gas producer plant added and some changes made in the four-cylinder engine to render it suitable for the new fuel.

The firebox and generator, which is a cylindrical chamber 24 in. diameter by 54 in. high, is mounted at the rear of the tractor, to the left of the driver, and the main gas scrubber, a cylinder measuring 40 in. in height by 14 in. in diameter, is on the right hand extremity of the frame.

Saving in Fuel Costs

The gas is led forward from this scrubber to a couple of filters under the hood. With the use of charcoal there is a saving of 80 per cent in fuel costs compared with gasoline, but the power loss is nearly 25 per cent. This type of tractor is approved by the French War Department.

The French branch of the English Austin company is exhibiting its four-wheel tractor with the Lion gas producer plant, also running on charcoal, and a similar change has been made on the French Mistral four-wheel tractor. The Scemia company, a French firm specializing in tractor construction, has brought out its twin-cylinder tractor with the Autogaz plant for producing gas from charcoal.

Although not taking part in the exhibition, other French firms paying close attention to gas producer plants for trucks and tractors are Panhard-Levassor, Delahaye, Chenard-Walcker and Berliet.

Electricity as applied to the farm is receiving comparatively little attention, although the French Government is working on a big program of electrification by water power and of distribution of current in farming regions.

Heavy Oil Development

The use of heavy oils for tractors and particularly for stationary engines is a prominent development revealed at the show. Fiat has on exhibition a standard type agricultural tractor with L-head engine with a special carburetor and heating device enabling gas oil to be used.

For stationary work on the farm two-stroke heavy oil direct injection engines are attracting more and more attention on the part of European manufacturers, prominent makers being Renault and Ballot.

Another Wire Sent to Senator Couzens

Makers Insisting That He Correct Statement of What Their Attitude Is

WASHINGTON, Feb. 6—Failure of Senator James Couzens of Michigan to correct his public declaration, made from the floor of the Senate, to the effect that the automobile industry was not interested in the reduction of the excise taxes on automobiles, has resulted in another "broadside" from Detroit automobile manufacturers, again demanding a retraction of the Senator's statement, and asking that the public records be corrected so far as the attitude of the automobile industry is concerned.

Makers Give Their Version

The following telegram, dated Feb. 4 and signed by thirteen automobile manufacturing executives, was sent to Senator Couzens:

Representing, as we do, a large number of Michigan leading automobile companies, we again ask you to correctly state our attitude regarding the removal of war excise tax on motor cars, motor trucks and parts. Local Detroit papers on Jan. 29 quote you in a statement you dictated as saying that leading automobile manufacturers you had talked with two months ago were not concerned about the removal of the excise tax.

The facts are that before you first published statements we made a protest to the Ways and Means Committee, the proper body to receive such protests, and our protest was of public record, open to you had you posted yourself before making your public statement which so incorrectly expressed our attitude. As a representative of this State we feel that it was your duty to find more accurately the sentiment of your constituency regarding such important questions affecting the prosperity and wage earners of Michigan.

You also say, in your dictated statement, that the consumers have not been heard from. You will find that the consumers of motor vehicles were properly represented before the Ways and Means Committee and made energetic requests for the repeal of the automobile taxes.

Since the Ways and Means Committee has voted to remove or reduce almost all of the war excise taxes, except those on the automobile owner, we feel that he is thereby subjected to an unfair discrimination. We know that 15,000,000 motor vehicle owners are vitally interested in this subject.

The large number of people in Michigan identified in various ways with the motor industry expect you to correctly state their attitude.

Signatures on Telegram

The telegram was signed by the following motor builder executives:

Harry H. Bassett, president, Buick Motor Co.; Roy D. Chapin, chairman of the board, Hudson Motor Car Co.; William L. Day, president General Motors Truck Co.; George N. Hannum, president Oakland Motor Car Co.; A. B. C. Hardy, president, Olds Motor Works.

Charles D. Hastings, president, Hupp Motor Car Corp.; Frederick J. Haynes, president, Dodge Brothers; Harry M. Jewett, president, Paige-Detroit Motor Car Co.; W. S. Knudsen, general manager, Chevrolet Motor Co.; Alvan Macauley, president, Packard Motor Car Co.; Martin L. Pulcher, president, Federal Motor Truck Co.; Herbert H. Rice, president, Cadillac Motor Car Co. and Richard H. Scott, president, Reo Motor Car Co.

Defending his position in the controversy, Senator Couzens issued the following statement, over his signature, to representatives of the press and to AUTOMOTIVE INDUSTRIES, in reply to the telegram received from the Detroit automobile manufacturers:

The motor car industry of Michigan and some of the newspapers have been criticizing what I said on the floor of the Senate recently about the motor car industry not wanting a repeal of the excise tax on motor cars, but preferring a reduction in surtaxes.

Whether the industry did or did not know the facts I do not know, but certainly the people should know them and for that purpose I desired to draw to their attention a letter from the Secretary of Treasury to the chairman of the Ways and Means Committee of the House of Representatives dated Nov. 10, 1923, which letter contains what is known as the Mellon plan of tax reduction.

What Mellon Proposed

In this letter the Secretary proposes a reduction in taxes on (1) earned incomes amounting to $97,500,000; (2) normal income taxes, $91,600,000; (3) surtaxes, $100,000,000; (4) telegrams, telephones, etc., $30,000,000; (5) admission taxes to moving pictures and other theaters, $70,000,000, making a total reduction of $389,100,000.

He proposes several plans that will increase the revenue of the Government to $68,000,000, which, when deducted from the total reductions, leaves a net reduction of $321,000,000, a sum somewhat in excess of the surplus.

Not only did he not make any mention of repealing the excise tax on motor cars, motor trucks, tires, and other parts, but he said: "There is not enough margin of revenue available to permit the repeal of the special taxes, which are proving productive."

I have received many letters from motor car manufacturers indorsing the Mellon plan, which I point out does not mention or approve of repealing the motor car taxes. In fact, the General Motors Corp. sent out a letter addressed to its stockholders and employees dated Dec. 12, 1923, to which they attached a copy of the Secretary's proposal and said among other things:

"The Mellon plan makes substantial reductions in the taxes of all. An important feature from a business and economic standpoint is that there be a substantial reduction in surtaxes. The interests of our stockholders and employees in this matter are identical."

Customers "Not Mentioned"

No mention, you will see, is made of their customers, but only their stockholders and employees. Their letter further says: "If, after studying the tax revision plan so ably presented to Congress by the Secretary of the Treasury, you are in sympathy therewith and agree with your officers that it is important to have our Federal tax laws revised substantially as recommended in the Mellon plan, then kindly sign the inclosed letter addressed to the Congress of the United States and return same to us in the inclosed stamped envelops."

(*Continued on page* 318)

Fight Will Continue for Repeal of Taxes

N. A. C. C. Preparing for Battle in House—Committee's Action No Deterrent

(*Continued from page* 307)

Clancy, who introduced the three bills which seek to wipe out the motor excise taxes, sharply criticizes Mr. Green, declaring that the committee's action so far as automobiles are concerned was decidedly partisan.

"Any tangible relief whatsoever was killed by the weight of numbers of the Republican majority of the committee. The Old Guard was in the saddle," he said. "I charge that the railroad interests represented in Congress and in the Treasury Department have been opposed to any relief for the automotive industry, and for the same reasons that they opposed the building of the Panama Canal and free canal tolls, because both the canal and the automobile industry with its cars and trucks make transportation cheaper for passengers and for freight."

Mr. Clancy then proceeded to tell of the consideration given the motor taxes by the committee. He said:

Cites an Example

What happened yesterday in the committee shows conclusively that Chairman Green and the Old Guard of the committee regarded the question as a party matter. Representative McLaughlin moved that the parts or misfortune tax be reopened for discusssion. Representative Ogden Mills of New York, who has led the fight against the automobile industry from the beginning of this Congress, and who is generally reputed in Congress to be friendly to railroad interests, promptly objected that the McLaughlin motion was out of order. Chairman Green showed his bias by sustaining the Mills motion and peremptorily closed the discussion.

The reason Representative McLaughlin tried to reopen the question was because I had convinced him earlier in the day that the automobile tax question was being considered strictly on a partisan basis and that the Republican party, and particularly the Republican members of the committee, would have a hard time at next fall's elections to explain to some 15,000,000 of irate car owners why they got no relief. These members could also explain why they did give relief to the luxury interests pleading before them, such as candy, jewelry, cosmetics, perfumes, etc.

Chairman Green showed his attitude still more plainly at that meeting by putting the "gag rule" on Representative Rainey, one of the Democratic leaders. Rainey insisted upon discussion of his motion to reopen the automobile tax question. Chairman Green peremptorily adjourned the meeting.

MORE FORD BODY PLANTS

DETROIT, Feb. 4—Three more body plants, making six in all, will be built at the Iron Mountain plant of the Ford Motor Co. In addition 250 homes for employees will be constructed.

G.M.C. Buys Tract to Make Road Tests

Corporation Will Be Able to Determine Various Factors in Car Performance

NEW YORK, Feb. 6—An outdoor laboratory of a magnitude never before attempted in the automotive world is made possible through the purchase by the General Motors Corp. of a tract of land consisting of 1125 acres in Oakland and Livingston counties, Michigan, about four miles from Medford. This is about the center of a triangle, three corners of which are Lansing, Flint and Detroit, at which points, as well as at Pontiac, are located the car operations of General Motors.

On this tract will be constructed a system of roadways which will be representative of all types and conditions of roads, such as the most modern paving, good and poor country roads, hills of all kinds and descriptions, as well as roads specially constructed to determine various factors in car performance. In addition there will be suitable living quarters and testing facilities for the corporation's technical staff.

In announcing the purchase, General Motors states that when the development is completed practically all road testing will be made at Medford, thus relieving the regular highways of work of this character. It is believed that such work can be done much more thoroughly, as well as effectively and economically, conducted in this manner.

The concentration of such work will bring together the entire technical staff, and it is declared that it is sure to result in still furthering the position of the corporation's products from the technical standpoint.

Goodyear's Daily Output Exceeds 30,000 at Akron

AKRON, Feb. 6—Goodyear Tire & Rubber Co. has increased production a total of 2500 since the beginning of the month, bringing production to slightly in excess of 30,000 tires a day at the Akron plant.

This is the only increase which has been reported thus far during the month and leaves production at about 100,000 tires a day for the Akron district. This is lower than the production ticket a year ago, when a peak of 112,000 was reached during February.

As far as can be learned now no large increases are anticipated during the month. Additional workers are not being taken on, and hiring is confined to replacements.

CHEVROLET OUTPUT FOR YEAR

NEW YORK, Feb. 4—Official figures just announced show that Chevrolet sales for 1923 totaled 483,310, as compared with 242,373 in 1922. The grand total from the introduction of the car in 1914 to the end of 1923 is 1,437,376. Sales by years were as follows: 1923, 483,310; 1922, 242,373; 1921, 77,627; 1920, 155,647; 1919, 151,019; 1918, 93,814; 1917, 125,399; 1916, 69,682; 1915, 13,500; 1914, 5005. The Chevrolet plants this year have a capacity for the production of 750,000 to 800,000 cars.

Suit of Aircraft Maker Dismissed as Too Vague

WASHINGTON, Feb. 6—The $51,510,000 suit brought by Capt. James V. Martin, aircraft manufacturer of Garden City, N. Y., against twenty-eight corporations and thirty-eight individuals for alleged conspiracy has been thrown out of the District Supreme Court because of "vague and indefinite allegations." A motion to strike the suit from the court records was granted by Justice Frederick L. Siddons, in Circuit Court, yesterday.

Captain Martin charged that the defendants had conspired to monopolize the aircraft business; that they had slandered him and his business; had made plans against his life, destroyed Government reports commending him and had ruined him financially.

The declaration was so worded that the court considered it too vague and indefinite and that it failed to meet the requirements of law with regard to civil pleadings.

33,933,936 Casings Were Made Last Year

NEW YORK, Feb. 6—The Rubber Association of America has completed its report on 1923 inventory, production and shipments of casings, tubes and solids. The production figures show an increase from 30,698,139 casings in 1922 to 33,933,936 in 1923. Inventory in 1922 was 58,401,086; in 1923, 67,448,419. In 1922, 29,221,899 casings were shipped, while last year this was increased to 32,991,810.

Figures on inner tubes show 87,807,770 in inventory for 1923, as against 72,463,938 in 1922; 45,181,083 produced in 1923, as against 38,137,181 in 1922, and 43,554,963 shipments in 1923, compared with 36,656,435 in 1922.

Solid tire inventory was 3,013,674 last year, as compared with 2,320,650 the preceding year; production, 692,148, as against 786,603, and shipments 690,090, as compared with 688,845.

The December inventory of casings was 4,329,300, compared with 4,599,208 in November; production 2,437,148, as compared with 2,656,942, and shipments 2,603,617, as compared with 2,934,079.

AMERICAN CHAIN LICENSES

BRIDGEPORT, CONN., Feb. 6—The American Chain Co. announces that licenses under its bumper patents have been taken by the Oakland Machinery Co., Oakland, Cal.; Federal Pressed Steel Co., Milwaukee; Penn Spring Works, Baldwinsville, N. Y., and Temme Spring Corp., Chicago.

G. M. Common Stock Earned $3.12 Share

Preliminary Report Places Sales Mark Made in 1923 at $698,000,000

NEW YORK, Feb. 6—General Motors common stock earned $3.12 a share in 1923 as compared with $2.30 for 1922, according to the preliminary report of the corporation on its last year's business.

Net sales broke all previous records with a total of $698,000,000 as compared with $463,706,136 in 1922. Net earnings of $61,825,000 are reported as compared with $51,496,136.

The preliminary report is based on actual operating figures for the first eleven months, with an estimate made of the twelfth. The complete report will be made public in time for the annual meeting of the stockholders.

The figures announced today show that the earnings on the common stock—$55,000,000—will equal $2.66 a share as against $2.19 last year, the stock being of no par value. When the per share proportion of the Fisher Body Corp.'s undivided profits accruing to General Motors—.46—is taken into consideration, the total earned on the General Motors common equals $3.12 a share as stated above.

Other figures quoted show that $6,825,000 will be required for preferred and debentures dividends as compared with $6,429,228.

Motors Metal Had Good Year; Officers Elected

DETROIT, Feb. 5—Motors Metal Manufacturing Co. has elected the following officers for the year: George Roehm, president; William Christian, vice-president; Robert McMath, treasurer and general manager, and Wilson C. Johnson, secretary. The above and the following comprise the board of directors: Francis C. McMath, Willard Pope, Charles R. Talbot, Lloyd N. Allen, George G. Harris, H. A. Burnett, F. G. Christian and Dr. T. A. Butterick.

The company reports a very satisfactory year and is in a strong position as to current assets, which are better than four to one over liabilities.

Assets of Ruggles Truck Offered in Three Parcels

DETROIT, Feb. 5—Assets and good will of the Ruggles Motor Truck Co., Ltd., of London, Ont., are being offered in three parcels—No. 1, products, material, supplies and good will, amounting to about $160,000; No. 2, service, stock and used cars, approximating $35,000; No. 3, land, buildings and equipment, estimated at $250,000.

The London & Western Trust Co., Ltd., London, Ont., is the trustee.

OUTLOOK FOR SPRING APPEARS GOOD

Buffalo

BUFFALO, Feb. 5—Automotive merchandising in this city and territory was better in January than in any corresponding month in the past, owing to the fact that Buffalo's annual automobile show stimulated buying to an extent most gratifying to its promoters.

A considerable number of prospects unearthed at the exposition have been converted into owners, and it is expected that February business will be good because of the persistence with which salesmen are following up potential buyers listed at the show.

Extra activity in Ford cars is expected in February because of advertising which the Ford dealers are putting out to the effect that they will allow higher prices on cars traded in during February than could be obtained in the spring.

The movement in used cars was normal during January and is expected to remain so through February.

Cincinnati

CINCINNATI, Feb. 5.—The retail automobile trade in Cincinnati is unusually good for this time of the year. The outlook for spring business among Cincinnati dealers is remarkably good. The industrial situation here is good and people seem to be well employed, with money to spend for cars. The replacement of cars is expected to be greater this spring than it has been for several years. The trade is a unit in believing that the spring months will be exceedingly prosperous in Cincinnati territory.

The used car market is only in fair shape at best. There are a good many used cars on the hands of local dealers and they are difficult to dispose of. This is due, in large measure, to the fact that the dealer makes a liberal allowance on a trade-in and, after he has made the necessary overhauling, the price that he must ask for the used car is almost as much as the price for a new car of the low-priced variety.

Kansas City

KANSAS CITY, MO., Feb. 5—January has been perhaps the dullest month in motor car selling, new or used, for a long time. The reason was fairly plain—temperatures below zero for four weeks, part of the time around 12 below.

Kansas City is not used to this kind of weather, and people kept indoors when possible and used other facilities than cars to a great extent. All trade was seriously lowered in this cold period. With the coming of warmer weather there was a distinct improvement of business in motor cars as in other lines, and dealers report a really good trade since.

But the lack during the first twenty days was not made up. Some dealers are said to have sold only two cars during January. There were cases, however, where dealers, especially in the lower priced cars, had arranged special merchandising events for January, who got the business coming strong immediately upon the modification of temperatures, and had a big month.

Prospects and hopes for big trade this spring are general. Used cars are beginning to go rather easily, under the argument, which the dealers and salesmen sincerely advance, that used car values will spurt upward in the next few weeks.

A slight lull in trade was expected in the two to three weeks before the annual motor show.

Indianapolis

INDIANAPOLIS, Feb. 5—A better January than was experienced a year ago with sales somewhat in advance of December is the report of those dealers and distributors who have lines that are marked as sellers in this section.

Some dealers have reported increased used car sales during the last month, though as a rule used cars are a drug on the market in this section. Good State business is found in many sections by distributors with popular lines, better conditions than usually obtain in Indiana at this time of the year.

Lines that are dragging now expect a spurt about the first of March when the motor show of Indianapolis will be given. Many dealers predict that March sales will be even better than those of last March, which made a phenomenal record.

Seattle

SEATTLE, Feb. 5—Automobile sales for January were better than for the same month a year ago but the usual normal let up is again in evidence with indications that February will be ahead of last February.

Emergency purchases of automobiles and trucks for immediate dispatch to Japan in connection with restocking and rebuilding operations have given way to purchases from the factories direct.

There is some sale for used cars, which are moving somewhat better than a year ago. Trucks are also selling better but the market will pick up substantially in April when a large amount of construction now contracted for gets under way in earnest.

Salt Lake City

SALT LAKE CITY, Feb. 5.—Every one seems to be enthusiastic regarding the outlook for spring. The feeling in this respect is better than it has been here at this time for the last three or four years.

The used car market has improved greatly in the last ten days according to officials of the Certified Public Used Car organization of dealers.

Milwaukee

MILWAUKEE, Feb. 5—One of the surprising features of trade during the latter part of January and early in February has been the consistency of the sales curve, which this year shows by far less peaks and valleys when describing day by day selling than a year ago, and in any past year, for that matter. Comparing notes, Milwaukee dealers find that the sales actually made on the floor of the local show which has just closed were far and away beyond anything heretofore known. One of the most favorable symptoms of the day is the substantiated report that general business in this territory during January represents a healthy increase over December, with employment as of Feb. 1 showing at least a slight excess over Dec. 1.

Most of the past week was one of temperatures above the freezing point, following a series of five or six cold waves during which new low records were established. Cold weather has never stopped owners in Milwaukee from using their cars all winter, but until now extreme temperatures have led owners of new cars to defer acceptance until spring rather than risk damage, internal or external.

Spring is not looked upon as a new buying season this year—merely a continuance of the good winter business local dealers are experiencing.

Philadelphia

PHILADELPHIA, Feb. 5—Orders for models secured at the Philadelphia show prove the exhibition stimulated trade moderately. Factories are able to make reasonably prompt deliveries though in a few instances orders were filled with difficulty.

Closed cars are in the greatest demand. Since the first of the year demand has improved, pointing to a good market in the first quarter of the year. The last three months were better than the corresponding period a year ago. Stocks on hand are moderate, collections fair to good, and used cars slow.

St. Louis

ST. LOUIS, Feb. 5.—Dealers are stocking pretty heavily in preparation for a heavy demand in the spring and it is expected that the active buying season will begin during show week here and become more active in the early part of March.

The stock of used cars, of course, is rather heavy at this time of the year, although the used car sales campaign recently put on by the St. Louis dealers in cooperation with St. Louis newspapers has been successful in reducing the number on hand.

At the present time the normal lull in new car sales is noticeable.

(*Other conditions on page* 319)

High Gasoline Prices May Be Investigated

Department of Justice Seeks Evidence from Attorneys General of States

WASHINGTON, Feb. 4—A simultaneous increase in the price of gasoline in a number of States has resulted in a request from the United States Attorney General's office to attorneys general of various States to make immediate reports to the Department of Justice on increased prices in their States.

The Department of Justice announces that another conference of attorneys general similar to that recently held in Chicago will be held immediately in Washington to investigate increasing prices of gasoline.

Attorney General Spillman of Nebraska was named chairman of the conference of attorneys general at the Chicago meeting. In a letter to the department, he states that the price of gasoline has increased 4 cents in his and nearby States, and he is anxious to ascertain if the increase is justified.

Twyman Getting Ready to Recondition Cars

INDIANAPOLIS, Feb. 6.—The Twyman Remanufacturing Co. is making steady progress in equipping its plant for the remanufacture of Nash and Buick cars. Before the end of this month, the company expects to begin active operations, as all equipment will be in place shortly.

Before the receipt of the first machinery several months ago, the old Lafayette plant, which had been leased by the company, was sold by its owners, and a unit of the plant of the Premier Motors was secured for the remanufacturing factory.

The change in location came early enough to prevent any delay with the Twyman organization. The tear-down line is ready and the assembly line will be complete in a short time.

Studebaker Uses Profits on Factory Improvement

CHICAGO, Feb. 6—Through spending $37,000,000 of its profits in the last five years in buying modern machinery, expanding the plants and reducing the labor turnover, the Studebaker Corp. has been able to reduce the men-hours-per car-produced from 329 hours in 1922 to 184 in 1923, executives told dealers at a banquet here.

Figures show that the average wages per man paid by the corporation have been advanced 124 per cent in the last five years.

The executives stressed the advantage of the new $10,000,000 closed body plant, and a significant statement was made that within a short time Studebaker expects to announce a new differential which will bring the selling price of closed and open models much closer together than they have been in the past.

The South Bend body plant has a capacity of 300 closed bodies a day, and it takes twenty-one days for a job to go through, in which time it is given eighteen coats of paint. Twenty-seven hundred bodies are in process of building at one time in the plant.

Kennerdell Again Heads Contest Board of A. A. A.

WASHINGTON, Feb. 4—Richard Kennerdell is once more chairman of the contest board of the American Automobile Association, a position which he held for eight years, resigning in 1922 prior to the split in the ranks of the A. A. A.

President Thomas P. Henry appointed Mr. Kennerdell to succeed Joseph Mack of Detroit, who retired from office recently because of pressure of personal business. Mr. Kennerdell has taken charge of the New York offices of the contest board, which will be moved to Franklin, Pa., the home town of the chairman, on March 1. From that time on all racing matters will be handled from Franklin.

Marking his return to office, Mr. Kennerdell announced the appointment of three of his old board, ex-Congressman Clifford Ireland of Peoria, Ill., George F. Ballou and C. G. Sinsabaugh of New York City. A fourth appointment was that of Samuel E. Hibben of Chicago, long prominent as the leader of the Chicago Athletic Association in its interclub team reliability matches with the Chicago Automobile Club.

New Ohio Truck Fee Law Held Up by Injunction

CINCINNATI, Feb. 6—The State of Ohio has been enjoined from the enforcement of the tax on trucks of more than 25 hp., pending a further decision of the courts. In the meantime truck owners may continue the use of their 1923 license plates after Jan. 31.

Under the Freeman-Collister Act, trucks of 25 hp. and over are required to pay an increased license fee this year and each year thereafter of approximately 200 per cent.

Law Restrained in Indiana

INDIANAPOLIS, Feb. 6—A restraining order has been granted by Judge Miller of the Superior Court here which holds that motor vehicle operators may not be arrested for failure to take out 1924 motor vehicle licenses pending the action of the Supreme Court on the new motor vehicle license law now in the court and held unconstitutional by a lower court.

The higher fees of the new law would have added about $3,000,000 annually for use of the State highway department, and would have made possible, with the gasoline funds, the taking up of the entire Federal aid balance of approximately $10,000,000 by the end of 1926.

Traffic Relief Plan Offered in New York

Association Suggests City Commission and Enlargement of Police Force

NEW YORK, Feb. 6.—Stirred by the discovery that 1073 persons were killed by automobiles in New York City last year and that there were 31,812 automobile accidents in the metropolis in 1923, the Merchants Association has announced fifteen recommendations for the relief of traffic congestion and the safety of the people in the streets of the city, following a long study of conditions by its Committee on Control of Street Traffic.

The creation of a permanent, non-political City Planning Commission and the enlargement of the Police Department are favored. It is urged that the commission be given authority to devise and carry out a comprehensive plan for the decentralization of traffic through the elevation of Manhattan sidewalks and roadways, removal of elevated railway structures, extension and widening of many thoroughfares and many other improvements.

With more police it would be possible, it is thought, not only to control taxicab and other vehicular traffic better, but also to stop jay-walking through the control of pedestrians.

Definite suggestions are made as to the removal of several elevated structures. The widening of roadways by setting back sidewalks to house lines is proposed for nearly all of the transverse streets and some of the longitudinal streets in central Manhattan.

The report also calls for the licensing and examination of all the drivers in the State and the police are asked to devise a method of restricting the cruising of taxicabs in search of business by providing many additional taxicab stands.

European Grand Prix Will Have Lap Prizes

PARIS, Jan. 29 (*by mail*)—On the suggestion of René Thomas, winner of the 1914 Indianapolis race, lap prizes have been instituted for the European Grand Prix road race, to be held at Lyons next August.

Within a few hours after the suggestion was made, prizes began to roll in, the first coming from René de Knyff, chairman of the French Racing Board; the Hartford Shock Absorber Co. followed with seven lap prizes of 500 francs each, the Goodyear Tire Co. contributed 1000 francs for the fastest time on the initial lap, and M. Champoiseau of the Dehiron Shock Absorber Co. sent in a cash prize of 1000 francs for the fastest work at the pits.

It is believed that a big total in lap prizes will be collected to swell the 135,000 francs to be distributed among the first three men home.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The upward trend which has been noted in business movements since the first of the year continued last week. Steel production increased further, stock quotations were higher, and prices of basic commodities were firm or upward.

The production of crude petroleum in the week ended Jan. 26 averaged 1,894,900 barrels a day, comparing with a daily average of 1,889,450 barrels in the preceding week and 1,755,300 barrels a year ago. Further price increases are reported in Eastern crude oil and gasoline. The total production for 1923 reached 725,702,000 barrels, which compares with 556,531,000 barrels in 1922, and is nearly 40,000,000 barrels more than the total world production in 1920. Stocks increased from 264,578,000 barrels on Dec. 31, 1922, to 333,053,000 barrels on Dec. 31, 1923.

Revised figures of foreign trade for December show exports of $426,798,981 and imports of $294,066,798, bringing the year's totals up to $4,091,152,000 and $3,791,938,000 respectively. The year's export balance of $299,214,000 compares with $652,587,000 in 1922 and $1,869,781,000 in 1921.

Fisher's index of wholesale commodity prices rose sharply last week from 150.0 to 153.4, the highest figure recorded since the second week in November. Dun's monthly price index stood at 191.095 on Feb. 1, as compared with 189.930 on Jan. 1 and 186.250 on Feb. 1, 1923.

Loans of reporting member banks declined $19,000,000 during the week ended Jan. 23, $17,000,000 of the decline being in commercial loans. Net demand deposits decreased $98,000,000, while time deposits increased $25,000,000. Borrowings from Reserve banks increased $10,000,000.

Both call and time loan rates were slightly higher last week. Call money ranged from 4 to 5 per cent, as against 4 per cent the week before, while time loans were at 4¾ per cent as against the previous week's range of 4½ to 4¾ per cent.

Another Telegram Sent Senator James Couzens

(*Continued from page* 314)

The Cadillac Motor Car Co., in their factory publication dated Dec. 19, 1923, referred to this General Motors Corp. letter and said among other things, "It is suggested that you sign the letter prepared for your convenience and hand it to your foreman," but nothing was said whatsoever about the customers.

I am now getting telegrams dated Feb. 2 saying, "We consider the repeal of the automobile sales tax law of vital importance to the automobile industry. We look to you as representing Michigan to use every effort to secure a repeal of this tax which under present circumstances we consider unjustly discriminatory." This, you will observe, occurs nearly three months after the proposal of the Secretary of the Treasury and after a strenuous campaign to get the Secretary of the Treasury's plan adopted.

I drew the attention of the people of Detroit, last November, to the fact that the Mellon proposal made no mention of automobile taxes and since which time all of the campaign for the approval of the Mellon plan has been going on.

Bill to Be Reported Monday

WASHINGTON, Feb. 7—Consideration of the Mellon tax reduction bill was completed by the Republican members of the House Ways and Means Committee on Tuesday. The vote on ordering it reported to the House will be taken at a perfunctory meeting of the whole committee today, when the Democrats will be called in for the first time since they were shut out for alleged partisanship in connection with the surtax schedule.

A favorable report on the measure, which provides no relief for the repeal of the excise taxes on automobiles, trucks, tires, parts or accessories, is certain. The Republicans, who have a committee majority, are pledged to vote it out as agreed upon by a majority of their own side. The Democrats will not even be given an opportunity to offer their plan as a substitute.

The bill will be reported to the House on Monday, but it is doubtful if action will be had upon it immediately. Chairman Green said it was thought by leaders that one or two more appropriation bills ought to be disposed of, so as to give the Senate something to work on.

The last feature of the bill, finally whipped into shape on Tuesday, was the Green proposal for a flat reduction in this year's taxes on last year's income and the jewelry tax.

Capacity Operations Rule in Some Plants

(*Continued from page* 306)

period. Shows are attracting exceptionally large crowds and this is one of the factors that lead manufacturers to plan high production schedules for the first quarter, at least, and extending well into the second.

Increased operations are apparent in the truck branch of the industry where builders are actively engaged in meeting the demand for trucks and filling the needs of bus operators. Some stimulus has been given to truck manufacture through the fact that another railroad has seen the feasibility of using this means of conveyance for short hauls in lieu of freight train service.

The generally good conditions with both car and truck builders are being reflected in parts centers where activities are progressing at a high point.

PAIGE JANUARY OUTPUT

DETROIT, Feb. 4—Paige-Detroit Motor Car Co. reports the production of 5451 Paige and Jewett cars in January, as compared with 2949 in January, 1923.

FINANCIAL NOTES

Johns-Manville, Inc., reports for 1923 gross sales of approximately $42,000,000, against $30,624,202 in 1922. After allowing for all expenses and charges a net income is shown of $3,078,928 as against $2,262,528 in 1922. Net profits were equivalent to $12.31 a share on the 250,000 shares of common outstanding. Cash holdings of $1,148,456, against $1,254,933 were shown on the general balance sheet on Dec. 31.

Jordan Motor Car Co.'s estimated net earnings for 1923, after taxes but before dividends, are placed at approximately $700,000. After allowing for devidends on the 7 per cent preferred stock, earnings equaled more than $50 a share on the 12,000 shares of common. Net book value of common stock as of Nov. 30 was $868,000, or $72 a share.

Mullins Body Corp.'s report for 1923 shows gross sales of $3,486,805, with a gross profit on sales of $248,444. Surplus as of Dec. 31 was $1,992,021, while net gain for the year under expenses was $106,202. The balance sheet shows current assets on Dec. 31 of $1,500,485, against current liabilities of $1,082,499.

Savage Arms Co. reports net profits of $404,044 for 1923, equal to $4.50 a share earned on the $7,748,000 common stock outstanding. The profits were figured after allowing for the regular 6 and 7 per cent dividends on the preferred stock. In 1922 the company reported a deficit of $168,160.

Yellow Manufacturing Acceptance Corp. has been advised by its New York banking connections that the $5,000,000 secured collateral ten-year 6½ per cent gold notes has been oversubscribed and the books closed.

Mack Trucks, Inc., shows in its preliminary report for 1923 sales of $43,000,000, an increase of $12,000,000 over 1922, and net earnings of $7,000,000 after reserves for depreciation and taxes, against $3,952,729 in 1922.

Timken Roller Bearing Co. has declared the regular quarterly dividend of 75 cents and an extra dividend of 25 cents, payable March 5 to stock of record Feb. 18. The dividends are the same as paid in December.

Studebaker Corp. has declared the regular quarterly dividend of $2.50 a share on the common stock and $1.75 a share on the preferred, payable March 1 to stock of record Feb. 9.

Curtiss Aeroplane & Motor Co. has declared a dividend of 3½ per cent on the new 7 per cent preferred stock, payable March 8 to holders of record on that date.

American La France Fire Engine Co. reports that the $500,000 common stock recently offered by stockholders has been oversubscribed by 32,000 shares.

Greenfield Tap & Die Corp. reports net earnings for 1923 of $613,690 after charges before depreciation, against $159,183 in 1922.

Borg & Beck report a net income for 1923 as $374,180 compared with $485,481 in 1922.

G. M. SALES IN JANUARY

NEW YORK, Feb. 4—General Motors units report sales of 66,400 cars and trucks in January in the preliminary estimate made by the parent company. This is a better showing than made in December, when the count was 61,370, and much better than January a year ago, when 49,162 sales were reported. Two years ago January had 16,088 sales.

SALES CONDITIONS

Atlanta

ATLANTA, GA., Feb. 5—Automotive sales in the Atlanta territory for the past month have been on an entirely satisfactory basis, dealers and distributors here state, with the demand for closed cars holding up well and a considerable improvement in lighter truck sales noted.

As a whole the volume of sales in January this year seems to have been substantially larger with a majority of dealers than was the case during the same month last year, and a majority of the dealers are looking for an excellent spring business.

While business in the larger cities of the district has been good, the principal improvement lately has been in the smaller towns and communities, a condition that has prevailed for some months. This is due to the good cotton prices prevailing, the purchasing power of farmers in this section being materially larger than it has been at any time since the post-war period.

The used car situation has assumed rather serious aspects. The tractor outlook is the best it has been in years.

Minneapolis

MINNEAPOLIS, Feb. 5—With the opening of the annual northwestern automotive show an impetus to automobile buying is expected from the rural districts.

The used car trade has renewed life in the cities the last week, but the wave has not reached the country. There is some overvaluation still going on in trades, something the best dealers are avoiding.

In general, the opinion is that several of the States in the Federal district will take several months or even until after a good crop before they will get the old stride in car purchases. Every move that is being made to introduce diversification of crops is a step toward better automobile business, and by the same token the dairy States are the best for dealers just now.

The South Dakota Bankers Association has just issued a statement that 95 per cent of the banks in that State are in good condition, and the State is just now realizing the biggest money crop produced by its farms in four years.

San Francisco

SAN FRANCISCO, Feb. 5—Automotive dealers are confronted by the best outlook for spring and summer business they have had in the history of the industry in central and northern California.

Sales for 1923 throughout the State were 24,216 new cars and trucks, as compared with 169,197 for 1922, an increase of 46 per cent for the year. Indications are that January, 1924, will exceed in sales any previous January by a large margin.

Despite the evenness of the climate, the demand for closed cars greatly exceeds that for open ones, even in the lower priced automobiles. Heavy rains just now, though late in the season and long delayed, have increased the confidence of the people in this year's cattle, grain and fruit production, and within the past week there has been a material increase in buying of new cars.

The demand for used cars of the higher priced makes continues strong, especially for cars which have been reconditioned by the dealers in those cars. Dealers in unconditioned used cars are not doing much business, and dealers in new cars of low prices are having difficulty disposing of their used cars even when reconditioned.

INDUSTRIAL NOTES

Flintex Corp. which was recently incorporated in Cincinnati, is erecting a one-story flat slab reinforced concrete building in which storage battery boxes of a material that resembles hard rubber will be manufactured. The building will be 66 x 135 ft., with the offices, laboratory and shipping room in front, the other part being devoted entirely to manufacturing purposes. An output of 10,000 boxes a month is planned, but the plant is large enough to manufacture 90,000 boxes monthly.

Warren D. Oakes, president of the Oakes Co. of Indianapolis, which recently effected a consolidation with the Martin-Parry Corp., announces that the merger will result in enlarged manufacturing facilities for the Oakes company. There will be no change in personnel and no change in the company's position as manufacturer of automobile fans and tire carriers.

Allied Die-Casting Corp., making automotive parts, is operating its new plant at Long Island City, N. Y. The officers of the company are: E. H. Kelley, president; E. N. Dollin, vice-president; G. W. Renyx, treasurer; W. E. Johnston, secretary and O. W. Hofmann, comptroller.

Sieg Co., Davenport, Iowa, has opened a Chicago office at 1421 South Michigan Avenue, in charge of H. H. Tuck, to care for the Warford transmission and Sieg California tops, together with other specialty lines the Sieg company controls in Chicago territory.

Favorable Report Made on Ford's Shoals Offer

WASHINGTON, Feb. 5—The bill to accept Henry Ford's offer for Muscle Shoals was formally reported to the House this week, with a recommendation from the House Military Affairs Committee that the Ford offer be accepted and the Government rid itself of the project.

The favorable report on the Ford offer came immediately after Mr. Ford notified the committee that he would not testify again before any congressional body on his offer and that Congress could leave or accept the offer as it saw fit.

He called attention to the fact that his offer had already been explained to Congress four or five times and that further explanation was unnecessary.

METAL MARKETS

An impressive amount of orders for steel products came to mills in all parts of the country during the last few days, and of this volume a proportionately large share was placed by passenger motor car builders and parts makers. There is no denying the fact that the market has gained genuine strength in the last fortnight, and that concessions have virtually disappeared. The leading steel producing interest is in even more favorable a position than the independents, and nearly all of its mills are being operated at top-notch rate of capacity. Automotive steels continue to be bought for immediate consumption, but it is obvious that much of the steel now being ordered by other industries is for deferred consumption.

Reserve stocks are being built up, and such accumulations tend to make consumers less dependent upon market vagaries. It is significant that, although a greater volume of steel has been sold during the last fortnight than in many months, predictions of early price advances are no longer heard. Most of the sales managers maintain a "let well enough alone" attitude. With operations at the present rate, most of the mills can make more satisfactory profits than if prices were somewhat higher and the volume of orders curtailed. The pig iron situation continues to come in for much attention. The market has definitely moved upward in the last few days.

Whether the rise in prices resulted from the maneuvers of the speculative interests who bought heavily a few weeks ago, or from somewhat better inquiry from melters is a debatable problem. Certain it is that the steel mills are not selling any pig iron, and that merchant furnaces no longer look upon their stocks as an encumbrance but rather as offering considerable opportunity for appreciation. In many cases pig iron producers have turned down bids which they knew emanated from speculators, not because of an altruistic desire to protect consumers, but because they feel that there is a possibility of the market enjoying another swing upward.

Time and again it has happened that the pig iron market would soar to dizzy heights without making the slightest impression on the steel price situation. The large, self-contained steel producers are little concerned over pig iron quotations, except that when the market turns highly attractive and they have any part of their pig iron production to spare, they may become sellers. Pig iron prices while on the uptrend, are still low. A report was current the other day that a Youngstown steel mill had bought a large tonnage of heavy melting steel scrap at a price on a parity with the then prevailing quotation for basic pig iron.

Pig Iron.—Automotive foundries are mostly buying in single car lots when not covered by contracts. Very few new orders are being placed.

Aluminum.—Rumors have been current for some time that the sole domestic producer would advance contract prices. As a matter of fact, the Aluminum Co. of America has no official contract price. It considers each and every order upon its individual merits, and its quotation in one case may not apply to another. "Outside" holders of small lots insist upon perpetuating the impression of an "official" quotation by the domestic producer.

Copper.—The market is lifeless and uninteresting.

Calendar

FOREIGN SHOWS

March 14-23 — Geneva, International Motor Exhibition, under the auspices of La Chambre Syndicale Suisse de l' Industrie Automobile.

April 2-13—Barcelona, Automobile Exposition, under the auspices of the Confederacion de Camaras Sindicales Espanolas del Automovilismo y Ciellismo, Palacio de Arte Moderno.

Aug. 23-Sept. 6—Toronto, Ont., National Automobile Show in conjunction with the Canadian National Exhibition under the sanction of the Canadian Automotive Equipment Association and the Automotive Industries of Canada.

Oct. 17-25—London, Annual Passenger Car Show, Olympia.

RACES

Aug. 3—Lyons, France, European Grand Prix.

April 27—Trapani, Italy, International Automobile Race.

CONVENTIONS

May 21-24—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

June 3-4—Detroit, Midsummer Meeting of the Automobile Body Builders Association, Hotel Statler.

June — Washington, Pan American Highway Congress, under the auspices of the Pan American Highway Mission.

Sept. 22-26—Boston, Sixth Convention and International Steel Exposition of the American Society for Steel Treating.

S. A. E. MEETINGS

Feb. 14—Indiana Section, Motor Tests and Research Work, C. P. Grimes, Hotel Severin, Indianapolis, 8 p.m. Dinner 6.30 p.m.

Feb. 14 — Metropolitan Section, Vehicle Depreciation.

March 13—Metropolitan Section, Replacement Parts and Accessories.

April 17—Metropolitan Section, Fleet Maintenance, F. W. Winchester.

May 15 — Metropolitan Section, What Roads and Steels Do to Automobiles.

French Makers Get Labor from Britain

PARIS, Jan. 28 (*by mail*)—British labor is being imported into French automobile factories by an agreement between the French and British Governments in order to relieve the amount of unemployment in England and provide labor where it is badly wanted in French shops.

It is not allowed to employ foreign labor in French factories until the percentage of unemployed in that particular trade has fallen below a determined figure. As in practically all branches of the French automobile industry, unemployment is non-existent, and there is an immense army of unemployed in England, the transfer plan was approved by both parties. In the automobile trade the firms making the greatest use of English mechanics are Peugeot and Schneider.

The practical difficulties met with in the development of this scheme are those connected with the language and housing. To avoid incompetents being brought over, a system of practical examination in England has been instituted by Peugeot in cooperation with the British Ministry of Labor. Because of the housing problem, only single men are accepted, but even with this restriction it is impossible to bring over all the men required, in view of the difficulty of finding lodgings for them.

British workers brought into France are paid on the French scale and have to accept French working conditions. These are satisfactory, except that the depreciated value of the franc makes the savings small when converted into British currency. If English workers out of employment refuse to accept the conditions offered them, they are liable to lose the State unemployment dole.

LARGER CARS FOR NEW HAVEN

NEW YORK, Feb. 6—Ten large motor cars of a new type have been ordered by the New York, New Haven & Hartford Railroad. The cars are made along the lines of a standard railroad coach.

Power for propulsion is supplied by a 120-hp. six-cylinder gasoline engine, and space is provided for sixty persons and 2000 lb. of baggage. The New Haven previously had operated three smaller cars, but has found the larger units more desirable.

Ford Kansas City Plant Now Assembles 250 Daily

KANSAS CITY, MO., Feb. 5—More than $1,000,000 is being expended on the new addition to the Ford assembly plant here to be completed by May 31.

Peter F. Minnock, general manager of the plant, states that the capacity of the plant will be more than doubled when 185,000 feet of new floor space are added. The plant now is turning out a daily average of 250 automobiles, but the addition will make possible an output of between 500 and 600.

A new power house also is under construction and will be finished by May 31.

Exports of Tires Dropped to $15,290,738 Last Year

WASHINGTON, Feb. 6—Exports of American tires in 1923 dropped to $15,290,738 as compared with $16,604,459 in 1922, according to figures of the Department of Commerce. This compares with peak exports of $43,899,502 reported for 1920. In 1919 exports were $28,924,659.

The decline in part is due to reduced prices during the second half of the year, although figures from some of the largest exporters indicate that their accounts were reduced in volume as well as in value. The year was marked by a keen competition in foreign fields characterized by price reductions on the part of many important European competitors.

Figures for some important users of American tires follow:

	1923	1922
England	$2,796,370	$3,301,073
Mexico	770,000	1,014,935
Argentina	1,133,270	987,187
Japan	586,083	123,792
Sweden	617,106	801,105
Spain	287,066	351,925
Venezuela	138,582	160,068
Chile	183,438	157,386
Australia	841,797	667,881
Br. Africa	602,965	832,983
New Zealand	955,482	692,137
Germany	52,561	10,761

Automobile Conquers Mountainous Country

PARIS, Jan. 29 (*by mail*)—Using Citroen creeper track automobiles, a French military attaché has succeeded in traveling from Peshawar, in northern India, to Kabul in Afghanistan, and is now continuing his 2000-mile trip to Teheran, in Persia. This extremely difficult and mountainous country has never previously been covered by automobile.

Starting from Peking, China, the French military attaché has succeeded in getting as far as Jehol, in Manchuria, with the aid of Citroen creeper track machines, thus penetrating a region which had never previously seen an automobile.

Prince Kemal el Dine, after ten days' preliminary excursions around Cairo, has set out with a convoy of Citroen creeper track automobiles with the intention of reaching the Oasis of Koufra, in the Libyan desert.

This is one of the few unexplored regions on the Continent of Africa and is supposed to be without any water supply for a radius of nearly a thousand miles. Some years ago the English explorer Rholfe penetrated a considerable distance into the desert and marked the farthest point of his advance by a water bottle.

Mosquitoes having been reported to have come from the direction of the center of the desert, Prince Kemal el Dine will endeavor to find the source of water from which they originated and to locate Rholfe's water bottle.

Studebaker-Wulff Plans to Reopen Excel Factory

AKRON, Jan. 29—Announcement has been made that as soon as legal technicalities can be taken care of, the Studebaker-Wulff Rubber Co. of Marion will start production in the former Excel Rubber Co. plant at Wadsworth with a line of cord tires.

The company was the highest bidder at a recent trustee's sale of the property. The consideration was reported in the neighborhood of $94,000. The Studebaker-Wulff organization recently purchased the Liberty Tire Corp. property at Carey, Ohio.